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THE IRON TRADE REVIEW

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CLEVELAND, MAY 27, 1920

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Advertisers' Index, pages 226, 227
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"Where-to-Buy", page 126
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Classified Advertisements, pages 192-225

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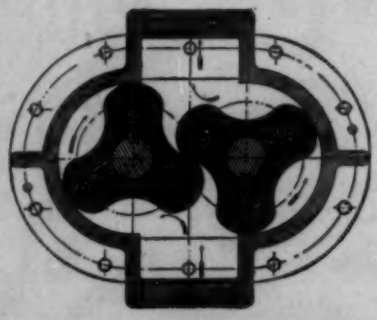

Say you saw it in THE IRON TRADE REVIEW

THE IRON TRADE REVIEW

Vol. LXVI Cleveland, May 27, 1920 *No. 22*

Works Adjust to Lower Outputs

Continued Repression of Operations By Railroad Conditions and Mounting Costs Forcing New Problems Upon Managements—Some Retrenchment Appears—Freight Movement Shows Some Increase—Tin Plate Stocks Reach 2,500,000 Boxes

AS THE return of normal operating conditions remains problematical, some readjustments to a further period of fractional production of iron and steel are beginning to appear. The action of a large Youngstown steel interest in reducing its clerical force 20 per cent suggests that actual retrenchment is receiving attention by some managements. These measures are not due to a lack of orders or of a large, unsatisfied demand but rather in spite of them since unfilled obligations are heavy. Manufacturers confronted by suddenly distorted costs, especially in fuel, are weighing future prospects wholly from an operating and not from a trade standpoint. The traffic situation as it applies to the iron and steel industry has shown some general improvement in the week by restored freight movements in congested areas. On the whole probably more material has been moved than in several weeks. The shortage of cars however is limiting the extent to which backed-up tonnage can be worked away and the latter has continued to gain.

Tin plate stocks in makers' hands have reached 2,500,000 boxes, or 125,000 tons. The shortage that has resulted has been felt most acutely by the canners who, it develops, have not more than 30 per cent of their normal supply of cans for perishable goods, now coming along for the season's pack. Pressure is being brought to bear on the Washington traffic authorities to relieve this serious situation by rushing forward tin plate shipments and working back to coal and essential supplies to the mills and steel works engaged in this line of production. The Carnegie Steel Co. has from 200,000 to 250,000 tons of steel held back from delivery at its plants in the Pittsburgh and Youngstown districts.

Ore Pooling in Doubt

Considerable difference of opinion has developed among the lake ore operators over the question of pooling their interests and of pro-rating shipments among the furnaces as recommended by the interstate commerce commission. The most powerful group of producers composed mainly of steel companies has aligned itself in opposition to the plan on the ground that the emergency is not so extreme as to warrant such interference with normal competitive conditions. To pool the tonnage would accrue to the advantage of those furnaces which have not fortified themselves on their supplies, it is declared. If the suggested plan is to be carried through, it probably will require a formal order from the interstate commerce commission. Ore shipments to date continue about 50 per cent of those for the corresponding period last year.

Steel Buying Slower

New buying in steel products with some exception, is in considerably less volume, reflecting the enforced reduction of consumption. Sheets, however, continue in active demand and buyers are bringing out more tonnage than the mills, with much production lost, can satisfy. Steel bar sales in good lots are reported by eastern mills at 4.00c, base. Structural shapes which could not be shipped against regular orders have been sold in the East at 3.10c, Pittsburgh. The placing at the railroads' disposal of $125,000,000 from the government revolving fund, is expected to release a large amount of equipment business. With all-steel freight cars costing $3000 to $3500 each, however, it is apparent that a much larger sum will be necessary before the minimum needs of 100,000 cars and 2000 locomotives may be satisfied. A fair amount of miscellaneous business in new equipment and repairs is being placed.

Europe Still Ordering

The international steel market has lost some of its recent sharp movements and buying has been modified because of the rapid advance of prices. At the same time some notable business still is being taken by American mills or is being offered to the latter. The market cable from England tells of an order for 35,000 tons of rails having been placed here. An European inquiry for 20,000 tons of sheet bars is before producers on this side. French bought 7500 tons of ship plates at 3.50c, Pittsburgh. Considerable resale material continues to be offered by Japan.

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Machinery Industry Confident of Future

MACHINE tool, machinery and supply manufacturers and dealers who celebrated machinery week in four separate conventions at Atlantic City, N. J., May 17 to 22, expressed unbounded confidence in the business future of their industry. It was the consensus of opinion that if any business depression followed in the wake of the prosperous year just passed, it would be temporary and short-lived. Continued reconstruction problems of no small magnitude have confronted the machinery industry during the past 12 months and are expected to continue to arise. That they will be solved is certain, but it was stated that their solution depended upon the patience and forbearance of the manufacturers and dealers backed by a spirit of never-failing American optimism.

That these reconstruction problems should still be present after 18 months of peace is not surprising. As one of the speakers expressed it: "The world was at war for five years and during that time its chief business was the killing of the enemy; it is not in the nature of things to recover from a period of that sort in one year or two or even three."

Perhaps no more opportune time could have presented itself for the conventions of the machinery interests. The one big problem before all in attendance was that of transportation. Dealers came ready to envelop the manufacturer with questions relating to the shipment of back orders, while manufacturers came prepared to explain why they were from two to ten months behind in filling their orders. Advantage of the opportunity was taken to iron out many grievances and differences which had arisen as the result of the abnormal trade conditions prevailing. The thought was expressed that while such items could be treated in correspondence, the recipient of the explanation would discount its value, believing his case peculiar, while by attendance at the convention, he was shown that what was true with regard to his business was multiplied many times because of general conditions.

It was the thought of the convention that only in continuing and increasing co-operation coupled with a never-ending faith in American industry could such problems as touch the labor, financial, transportation, raw material, export and other situations be met and solved.

Motor Trucks in Rail Tieup

UTILIZATION of the automobile truck as a means of alleviating the tieup of the railroads, has brought this method of transportation to the front as has no other condition in years, in fact since the automobile became recognized as an industrial factor. Since the outbreak of the outlaw rail strike, the truck has been utilized to the greatest extent by the various industries, in moving materials which were absolutely needed. To no small extent has the steel industry reverted to this method of transportation, both in getting in supplies and in shipping out finished product. Producers and consumers in the Pittsburgh and Youngstown districts especially have utilized trucks in shipping steel long distances. In some instances the convoys have conveyed the material as far as Philadelphia.

Transportation by truck obviously is more costly than by rail and the quantities able to be handled are limited, but the broad extent to which this method of transportation is serving industry under pressure, promises to have a considerable future influence. Many manufacturers for the first time are having demonstrated to them the practicability and efficiency of motor haul and the lesson will be retained. With the return of more normal conditions of industry, the position of the motor trucks in the scheme of manufacturing distribution undoubtedly will be more secure as an auxiliary of rail transportation and this suggests a line of continuing development which will be of material benefit to industry and to the country at large.

The Foreman as the Key Factor

THE foreman apparently is coming to be recognized as a most important factor in keeping industrial relations as they should be. During the conference of personnel officers in Chicago the past week this fact came to the front with impressing clearness. From this discussion it is apparent that those whose duty it is to improve relations between management and men are realizing that the foreman, who epitomizes to the worker the entire management must be instructed and aided in carrying the spirit of the organization to the men as no other official can.

It is pointed out that to the worker the foreman is the company and that the superintendent is visible occasionally while the president might as well be an inhabitant of Mars. The golden opportunity to tell the men what is in the policy of the employer has been lost in too many cases by not recognizing that the point of contact was so far down the line.

It is certain that all successful plans and methods which are aimed at the cementing of mutual confidence and the establishment of contented relations between employer and employed must take the foreman into principal account.

Ore Quality Is Kept High

GREAT progress has been made in scientific mining and mixing of iron ores as found in the Lake Superior district, and to this fact must be ascribed the remarkable continuation of the high quality of the ores as shown by the tables of analyses in this issue. From time to time statements are heard to the effect that the supply of high grade ores is being rapidly depleted, that the ranges "have seen their best days," and that greater effort must be devoted to utilizing the leaner ores.

Some of the deposits are richer than others, and this is a matter of importance among competing interests, but so far as the interests of the blast furnace industry in general are concerned, it is reassuring to know that the supply is still there, in abundance and of high quality. In 1902 the average content of iron in the ores from the Mesabi range was 55.39 per cent, and in 1919, 51.57 per cent. In 1902 the average for Old range ores was 54.71 per cent and in 1919, 51.73 per cent. The yearly decrease from 1909 to 1919 in the average iron content of all the ores was but 0.05 per cent. Similarly with regard to other constituents of the ores, no serious deviation is shown. The article on page 1543, together with the tables and charts, all prepared by W. L. Tinker, secretary of the Lake Superior Iron Ore association, are worthy of the careful thought and study of all those interested in the iron ore and blast furnace industry of the country.

Some of the credit for maintaining shipments of a high average of quality is due to those operators who have installed washing and concentrating plants for the treatment of ores, but the tonnage so treated is small comparatively. The real explanation probably is the fact that operators are giving a great deal of attention to the importance of mixing ores in order to prepare them for use in the furnaces. The ores as mined may vary widely in analysis, but when loaded on the boats the mixture is practically uniform. The ores are mixed at the loading docks, and by means of a carefully devised system for analyzing samples from each of the ore cars as they leave the mines and for checking the cars as they are dumped into the loaders, a mixture is shipped which when analyzed at the receiving ports and at the furnaces shows a surprising degree of uniformity.

Apprenticeship Courses as Insurance

PROBABLY few companies can boast a record comparable to that of the Warner & Swasey Co., Cleveland, which on May 19 celebrated its fortieth anniversary. During 20 years of this time the organization operated as a partnership while during the latter 20 years the business was conducted as a corporation, with both of the organizers actively engaged in handling the business. Both Mr. Warner and Mr. Swasey have gained personal prominence in engineering lines and have received many honors. With both having served as president of the American Society of Mechanical Engineers, probably no other company in the country has received so distinguished recognition. In a business way the company has established a notable position.

As a secret to the success of this company the apprenticeship course probably plays an important part. Nearly 40 years ago the employes were trained in the duties they were to perform. Since that time the course of instruction has been expanded to include every line of skill. Men graduated in these courses now hold high positions some of which are: Works engineer, superintendent, assistant superintendent production engineer, foremen of drafting room, employment manager and district sales manager together with many foremen, inspectors and others. Another feature of the organization and one which is perhaps due to the careful training of men is the fact that many employes are distinguished by their long terms of service; one has a record of over 35 years, one over 30 years, five over 25 years and 19 over 20 years. As a means of reducing labor turnover and of producing a long and healthy business growth, apprenticeship courses, as shown by the success of this institution, have proved themselves the best and cheapest form of insurance.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE, ORE AND OTHER PRICES ON PAGES 1578 AND 1582

Pig Iron

Bessemer, valley	42.50
Bessemer, Pittsburgh	43.90
Basic, valley	43.50
Basic, Buffalo	41.00 to 43.00
Basic, Pittsburgh	44.90
Basic, delivered, eastern Pa.	43.50 to 44.50
Malleable, valley	43.00
Malleable, Pittsburgh	44.40
Malleable, Chicago, furnace	43.50
Malleable, Buffalo, furnace	46.25
Malleable, delivered eastern Pa.	47.00 to 48.00

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.25
No. 2 Southern foundry	1.75 to 2.25
No. 2X Eastern and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 and up
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern delivered Phila.	$48.10 to 49.10
No. 1X, Buffalo	48.00
No. 1 foundry Chicago, furnace	45.25
No. 2 foundry, valley	44.00
No. 2 foundry, Pittsburgh	44.50 to 45.40
No. 2 foundry, Buffalo	45.00
No. 2 foundry, Buffalo, Boston del	48.90 to 49.90
No. 2X, Buffalo, Boston del.	50.15 to 51.15
No. 2 foundry, Chicago furnace	43.00 to 45.00
No. 2 foundry, Ironton furnace	44.00 to 45.00
No. 2 foundry, Cleveland furnace	43.10 to 44.00
No. 2X, eastern, del., Phila.	46.85 to 49.35
No. 2X, eastern, N. J., tidewater	47.10 to 49.35
No. 2X, Pennsylvania, Boston del.	48.90 to 51.15
No. 2 foundry, Pa., Boston del.	47.90 to 49.90
No. 2X, foundry, Buffalo furnace	46.25
No. 2 foundry, del., Philadelphia	45.60 to 48.10
No. 2 foundry, N. J., tidewater	46.10 to 48.10
No. 2 southern, Birmingham	42.00 to 44.00
No. 2 southern, Cincinnati	45.60 to 47.60
No. 2 southern, Chicago	47.00 to 49.00
No. 2 southern, Phila.	45.50 to 47.50
No. 2 southern, Cleveland	45.00 to 47.00
No. 2 southern, Boston	50.00
No. 2 southern, St. Louis	46.30 to 48.30
No. 2X, Virginia, furnace	45.25 to 46.25
No. 2X, Virginia, Philadelphia	49.25 to 50.25
No. 2X, Virginia, Jersey City	49.65 to 50.65
No. 2X, Virginia, Boston	49.95 to 50.95
Gray forge, valley, Pittsburgh	42.40 to 43.40
Gray forge, eastern Pa.	44.00 to 44.50
Silveries, 8%, furnace	55.00 to 58.00
Ohio Silveries, 8%, Chicago	56.30 to 59.30
Tennessee Silveries, 8%, Chicago	56.30
Low phos. standard, Phila.	55.80
Low phos. Lebanon, furnace	47.00
Low phos. stan. valley del., Pitts.	51.40
Charcoal, Superior, base, Chicago	57.50

Coke

(At the ovens)

Connellsville furnace	$12.00 to 15.00
Connellsville foundry	12.00 to 15.00
Pocahontas furnace	12.50 to 13.50
Pocahontas foundry	12.50 to 13.50
New River foundry	13.00 to 14.00
New River furnace	12.50 to 13.50
Wise county furnace	12.00 to 14.00
Wise county foundry	12.00 to 14.00

Ferroalloys

Ferromanganese, 80 per cent, delivered, domestic metal	$200.00 to 250.00
Ferromanganese, 80 per cent, English c.i.f. Atlantic ports	195.00
Spiegel, 18 to 22 per cent furnace spot	75.00
Ferrosilicon, 50 per cent, spot and contract, delivered	83.00 to 85.00
Ferrotungsten, standard, per pound contained, furnace	90c to 1.10
Ferrochrome, 60 to 70 per cent chromium, 6 to 8 per cent carbon, per pound contained, maker's plant	17c to 19c
Ferrovanadium, 30 to 40 per cent per pound contained, according to analysis	6.50 to 8.00
Ferro-carbon-titanium, carloads, producers plant, per net ton	200.00
Bessemer, ferrosilicon, 10 per cent	62.50 to 64.50
Bessemer, ferrosilicon, 11 per cent	65.80 to 67.80
Bessemer, ferrosilicon, 12 per cent	69.10 to 71.10

Prices at Jackson and New Straitsville, O.

Semifinished Material

BILLETS AND BLOOMS

(4 x 4 inch)

Open-hearth, Pittsburgh	$65.00 to 70.00
Open-hearth, Youngstown	65.00 to 70.00
Open-hearth, Philadelphia	64.10 to 74.10
Bessemer, Pittsburgh	65.00 to 70.00
Bessemer, Youngstown	65.00 to 70.00
Forging, Pittsburgh	80.00 to 90.00
Forging, Philadelphia	79.10 to 89.10

SHEET BARS

Open-hearth, Pittsburgh	$75.00 to 80.00
Open-hearth, Youngstown	75.00 to 80.00
Bessemer, Pittsburgh	70.00 to 75.00
Bessemer, Youngstown	70.00 to 75.00

SLABS

Pittsburgh and Youngstown	65.00 to 70.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$70.00 to 75.00
Grooves skelp, Pittsburgh	3.25c to 4.00c
Sheared skelp, Pittsburgh	3.45c to 4.00c

Shapes, Plates and Bars

(In cents per pound)

Structural shapes, Pittsburgh	2.45c to 4.00c
Structural shapes, Philadelphia	2.70c to 4.25c
Structural shapes, New York	2.72c to 4.27c
Structural shapes, Chicago	2.72c to 3.72c
Tank plates, Pittsburgh	2.65c to 3.75c
Tank plates, Chicago	2.92c to 4.02c
Tank plates, Philadelphia	2.90c to 4.25c
Tank plates, New York	2.92c to 4.27c
Bars, soft steel, Pittsburgh	2.35c to 4.00c
Bars, soft steel, Chicago	2.62c to 3.52c
Bars, soft steel New York	2.62c to 4.27c
Bars, soft steel, Philadelphia	2.60c to 4.25c
Bar iron, common, Phila.	4.00c to 4.25c
Bar iron, common, Chicago	3.75c to 4.50c
Bar iron, common, Cleveland	3.75c
Bar iron, common, New York	4.02c to 4.27c
Bar iron, common, Pittsburgh	4.27c to 4.50c
Hard steel bars, Chicago	3.75c to 4.00c

Rails, Track Material

Standard bessemer rails, mill	$45.00 to 60.00
Standard open-hearth rails, mill	47.00 to 62.00
Relaying rails, light, St. Louis	52.00 to 55.00
Relaying rails, Pittsburgh	50.00 to 55.00
Angle bars, Pittsburgh base	3.00c to 4.00c
Angle bars, Chicago base	2.75c
Light rails, 25 to 45, mill	2.45c to 3.75c
Spikes, railroad, Pittsburgh	4.00c to 4.25c
Track bolts, Pittsburgh	6.00c to 6.50c
Track bolts, Chicago	4.62c
Track spikes, Chicago	3.62c
Tie plates, Chicago	2.75c to 2.90c

Wire Products

(100 lbs. to jobbers, carloads; retailers, 5c more)

Wire nails, Pittsburgh	$3.25 to 4.50
Plain wire, Pittsburgh	3.00 to 3.75
Galvanized wire, Pittsburgh	3.70 to 4.45
Barbed wire, painted, Pittsburgh	3.40 to 4.15
Barbed wire, galvanized, Pitts.	4.10 to 4.85
Polished staples, Pittsburgh	3.40 to 4.15
Galvanized staples, Pittsburgh	4.10 to 4.85
Cut nails, Pittsburgh, l. c. l.	6.195
Coated nails per count keg, Pitts.	2.85 to 4.10c

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Chain, Piling, Strip Steel

(In cents per pound)

Chain, 1 in. proof coil, Pitts.	6.25c to 6.75c
Sheet piling, base, Pittsburgh	2.55c to 3.65c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 8.50c to 10.00c.

Sheets

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	4.35c to 9.00c
No. 28, bessemer, Pitts.	4.35c to 9.00c
No. 28, open-hearth, Chi.	4.62c to 8.27c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	4.35c to 9.00c
No. 28, bessemer, Pitts.	4.35c to 9.00c

GALVANIZED

No. 28, open-hearth, Pitts.	5.70c to 9.50c
No. 28, bessemer, Pitts.	5.70c to 9.50c
No. 28, open-hearth, Chi.	5.97c to 8.92c
No. 28, open-hearth, Philadelphia	10.00c to 10.50c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	3.55c to 7.00c
No. 10, bessemer, Pitts.	3.55c to 7.00c
No. 10, open-hearth, Chi.	3.82c to 6.77c
No. 10, open-hearth, Phila.	3.80c to 7.25c

Full Sheet Schedule Page 1582

Tin Plate

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.00 to $8.50

Iron and Steel Pipe

Base Pittsburgh to Jobbers Carloads

Base, Pittsburgh	Black Galv. Per cent off
¾ to 3 in., butt steel	54 to 57½ 40½ to 44
¾ to 1½ in., butt, iron	24½ to 34½ 8½ to 18½

Full Pipe Schedule Page 1582

Boiler Tubes

Steel, 3½ to 4½ inches, c. l.	30½ to 40½
Iron, 3½ to 4½ inches, c. l.	11

Cast Iron Water Pipe

Without War Freight Tax

(Class B Pipe)

Class A pipe is $2 higher than Class B

Four-inch, Chicago	79.80
Six-inch and over, Chicago	76.80
Four-inch, New York	79.30 to 80.20
Six-inch and over, New York	76.30 to 77.20
Four-inch, Birmingham	73.00
Six-inch and over, Birmingham	70.00

Hoops, Bands, Shafting

Hoops, Pittsburgh	3.05c to 5.50c
Bands, Pittsburgh	3.05c to 5.50c
Hot rolled strip steel, Pitts. stamping quality	3.50c to 7.00c
Cold finished steel bars, Pitts., base	4.10c to 6.50c

Rivets

Structural rivets, Pittsburgh	4.50c
Boiler rivets, Pittsburgh	4.60c
Rivets ⅞ in. and smaller, Pitts.	50 off

Nuts and Bolts

(Prices f.o.b. Pittsburgh)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	40–5 off
Cut thread	30–10 off
Larger and longer	30 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	40–10–5 off
Cut thread	40–5 off
Larger and longer	30–10 off
Plow bolts Nos. 1, 2 and 3 heads	40 off
Other style heads	20% higher
Stove bolts in packages	70–10 off
Stove bolts in bulk	70–10–2½ off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60–5 off
Cold pressed semifinished hexagon nuts ⅞ in. and smaller	60–5 off
Gimlet and cone point lag screws	50 off

NUTS

Hot pressed, square blank	2.00c off
Hot pressed, square tapped	1.75c off
Hot pressed, hexagon blank	2.00c off
Hot pressed, hexagon tapped	1.75c off
Cold pressed, square tapped	1.75c off
Cold pressed, square blank	2.00c off
Cold pressed, hexagon blank	2.00c off
Cold pressed, hexagon tapped	1.75c off

Prices Present and Past

Yesterday, a month ago, three months ago and a year ago

Prices are those ruling on the largest percentage of sales, at the dates named

	Prices May 26 1920	Average prices April 1920	Jan. 1920	May 1919
Bessemer, valley, del., Pittsburgh	$43.90	$43.50	$40.00	$29.35
Basic, valley, delivered, Pittsburgh	44.90	44.40	39.20	27.15
*No. 2 Foundry, val. del. Pittsburgh	45.40	44.20	40.90	28.15
*No. 2 Foundry, Chicago, furnace	43.00	43.00	40.00	26.75
Lake Superior charcoal, Chicago	57.50	57.50	48.75	31.75
Malleable, valley	43.00	43.00	40.35	28.65
Malleable, Chicago	43.50	43.50	40.50	27.25
*Southern, No. 2 Birmingham	42.50	40.00	38.20	27.35
*Southern Ohio, No. 2, Ironton	44.00	43.50	39.50	26.75
Basic, eastern del., eastern Pa.	44.00	43.70	39.75	28.80
**No. 2X, Virginia, furnace	46.25	44.25	41.25	27.50
**No. 2X, eastern del., Philadelphia	46.90	46.80	43.90	30.10
Gray forge, valley del., Pittsburgh	42.40	42.40	39.60	27.15
Ferromanganese, 80 per cent, delivered	200.00	200.00	146.00	130.00
Billets, bessemer, Pittsburgh	70.00	68.00	49.60	38.50
Sheet bars, bessemer, Pittsburgh	75.00	70.00	53.40	42.00
Sheet bars, open-hearth, Pittsburgh	80.00	78.00	53.40	42.00
Billets, open-hearth, Pittsburgh	70.00	70.00	49.60	38.50
Steel bars, Pittsburgh	3.25c	3.65	3.10	2.35
Steel bars, Chicago	3.52	2.87	2.62	2.62
Iron bars, Philadelphia	4.25	4.25	3.75	2.595

	Prices May 26 1920	Average prices April 1920	Jan. 1920	May 1919
Iron bars, Cleveland	$3.75	$3.75	$3.25	$2.52
Iron bars, Chicago mill	3.75	3.75	3.13	3.50
Beams, Chicago	3.72	3.72	2.72	3.72
Beams, Pittsburgh	3.25	3.25	2.64	2.45
Beams, Philadelphia	3.75	4.25	2.90	2.695
Tank plates, Pittsburgh	3.50	3.65	3.10	2.65
Tank plates, Chicago	4.02	4.02	2.92	2.92
Tank plates, Philadelphia	4.00	4.25	3.65	2.895
Sheets, blk., No. 28, Pittsburgh	7.00	6.00	5.00	4.35
Sheets, blue anld., No. 10, Pittsburgh	5.00	4.85	4.05	3.55
Sheets, galv., No. 28, Pittsburgh	7.50	7.50	6.35	5.70
Wire nails, Pittsburgh	4.00	4.00	4.25	3.25
Connellsville furnace coke	12.00	11.20	6.00	3.72
Connellsville foundry coke	13.00	11.60	7.00	4.35
Heavy melting steel, Pittsburgh	25.50	26.40	26.50	15.45
Heavy melting steel, eastern, Pa.	23.00	24.30	24.45	15.30
Heavy melting steel, Chicago	22.50	23.95	24.25	15.40
No. 1 wrought, eastern Pennsylvania	33.50	35.25	32.00	21.90
No. 1 wrought, Chicago	28.75	30.70	29.00	17.05
Rerolling rails, Chicago	31.50	32.50	33.00	17.45

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

Iron Interest All in Shipments

Producers and Consumers Concentrate Attention on Deliveries Against Old Orders Rather Than on New Business—Some 1921 Inquiry at Chicago—Southern Stocks Vanishing and Are at Lowest Point in Long Time

Chicago, May 25.—Few features mark the situation in pig iron in the Chicago district, difficulties of operation and some shortage of coke combining with the generally unsettled condition of business to limit the melt and thus prevent users from showing anxiety for further supply. Local producers are shipping a tonnage about equal to production and the railroad situation is showing comparatively little change. While some foundries are closed for lack of material, this is more often the result of coke shortage than of pig iron. Considerable iron is piled at furnaces in the Chicago district, but other western and northern stacks managed to keep fairly clear during the worst of the railroad tieup. Practically no inquiry is being put out except for prompt iron and all carloads in transit are sold readily by dealers to whom they are consigned. Practically the only demand is for prompt iron and almost nothing is being done on contracts for deferred delivery. Indications are that a number of melters who have not yet covered their last half requirements are nearly ready to inquire and cover their requirements. A Chicago melter recently bought about 1500 tons of northern foundry iron for prompt delivery, from a furnace further east, at a price figuring about $47, delivered, Chicago. A sale recently was made of prompt valley malleable at $50.05, delivered Chicago. Southern iron is equally inactive, with prices varying from $42 to $44, Birmingham, on both prompt and contract iron. A recent sale of 600 tons of southern foundry for last half was made at $42, Birmingham, and the buyer immediately inquired for 600 tons more for delivery during first half of 1921. This is the first instance known of an inquiry so far ahead, but the furnace refused to quote. Melters are finding much difficulty in obtaining sufficient fuel and are using every effort to persuade sellers to give them preference.

Blast furnace operation on the part of the Illinois Steel Co. has been reduced by the banking of one stack at Gary and one at South Chicago. This gives 19 active furnaces out of 29, about 65 per cent furnace capacity. However, production is at a higher rate, running between 70 and 75 per cent, the difference being represented by open hearth scrap. Banking these furnaces was not due so much to lighter receipts of fuel as to the fact that reserves had been drawn on too heavily and increased shipments had failed to come about as had been expected. Other producers are operating at the same schedule as has prevailed for several weeks.

Concentrate On Shipments

Philadelphia, May 25.—Chief efforts of pig iron sellers in eastern Pennsylvania are being devoted to trying to ship this product. This continues a difficult thing to do. New demand is slow and the week's total turnover was comparatively small. New inquiries are light. Eastern Pennsylvania foundry iron continues to be sold at $45 to $47 furnace for No. 2 plain (1.75 to 2.25 silicon) and $46 to $48.25 for No. 2 (2.25 to 2.75 silicon) with a number of sales at the outside figure. Although the demand is quiet, the market is strong and there are no signs of weakness anywhere. Virginia foundry iron is not being offered plentifully. The asking price on futures is $45 furnace for the base grade although spot Virginia metal is obtainable at $44 base. The gray forge market is devoid of transactions but this grade probably could be had at $44 eastern Pennsylvania furnace. No basic sales are reported and there are no active inquiries. The Stanley G. Flagg Mfg. Co. is inquiring for around 2000 tons of malleable and special basic. Low phosphorus iron shows some inquiry but no business has been done. The price on standard iron may go higher because of the difficulty of the furnaces getting coke shipped. The difficulty of obtaining spot coke at any price also continues to render the operating outlook uncertain.

Trouble to Get Cars

Cleveland, May 25.—While some makers in this territory had been able to move more iron the past week by means of carload shipments, this situation is not general among the producers. Most of the latter had been barely able to duplicate their previous week's records in this respect and there is an increasing difficulty on their part in obtaining sufficient cars owing to the diverting of much equipment ino the coal traffic. Permits are more readily obtainable by the furnaces from the railroads but the problem is to get the cars by which to execute them. Sales are practically negligible. The exceptance to this rule was a closing in a week by one producer of about 1000 tons of spot and 7000 tons of third quarter business at $44 base furnace for 1.75 to 2.25 silicon. A lot of 2500 tons of malleable for third quarter at $44.50 furnace was included. Present inquiry is very light. There had been some cases where consumers have ordered the furnaces to suspend

shipments but in one of these instances, deliveries again had been ordered forward. The McKinney Steel Co. has blown out one of its Cleveland furnaces for relining. The United Alloy Steel Corp. at Canton which was down to four open-hearth furnaces a week ago now is running 10 furnaces and has been taking in pig iron accordingly.

More Furnaces Are Active

Pittsburgh, May 25.—Marketwise, the situation in pig iron rarely has been so devoid of features as it has been in the past week. Several merchant furnace interests have not concluded a sale even of small tonnages. The most important business was in basic in which about 5000 tons were closed at approximately $43 valley basis. A steel foundry interest was the principal buyer. A sheet maker continues to figure on 12,000 tons of basic. Transactions have been fewer in the past week than they were recently. This condition probably finds explanation in the fact that most of the blast furnace interests had been able to make slightly better shipments than recently, due to an easing in the transportation situation. Some attempt is noted on the part of melters to line up their last half requirements but no actual business has been done. Producers still are disinclined to commit themselves on last half tonnages until they have a clearer line on the amount of iron sold for first half which they will be obliged to carry over into last half and also some definite idea as to fuel costs. Prices of the various grades hold unchanged but merely are nominal in the lack of important sales. Some doubt exists whether producers would duplicate the lost sales. Low phosphorus iron is the case in point. The last sale of this grade in this district was at $50 valley furnace and that is as high as any sales have been made here. The valley producer of this grade, however, is obtaining $51 and 52 on tonnages going into Ohio and New York states and now is quoting $52 minimum. A number of active blast furnaces is larger this week than a week ago. Struthers at Struthers, O., the Mattie furpace of the A. M. Byers Co., Girard, O., and No. 3 stack of the Shenango Furnace Co. and the Clair Furnace Co., Sharpsville, Pa., have resumed blowing and it is probably that the Alice furnace of the Valley Mold & Iron Corp., Sharpsville, Pa., will be in blast before the end of the week. The Carnegie Steel Co. has 36 active furnaces as compared with 33 a week ago. Some doubt exists that merchant furnaces can be kept going.

New England Hard Pressed

Boston, May 24.—New England foundries forced to use every expedient in order to keep metal in their cupolas, are struggling under a more severe pig iron shortage than existed at any time during the war. The three principal New England railroads are embargoed against shipment of pig iron in any of the customary routes. Shipments are of course coming through but in tonnages utterly inadequate to the needs of the foundries. Some eastern Pennsylvania furnaces have shipped to points in western New York in order to reach the New York Central at a free junction for reshipment over the Boston & Albany to New England points. In many shipments reported, the freight has been double the usual amount. Permits over the New York, New Haven & Hartford railroad have been issued much more freely during the past week and Connecticut foundries have experienced considerable relief although operation in the case of a large percentage of these still is on a curtailed basis. Even some of the large foundries have been forced to close down one or two days a week. With this situation it is not surprising that there is little interest in future iron. Spot iron is able to command exceedingly high prices. Sprue scrap has sold at $47, delivered to consumer. Furnace prices have remained practically the same in all districts, although there is a firmer tone in the case of Virginia interests. One Virginia furnace refused to accept an order for approximately 1000 tons at $44, furnace, or $48.70, delivered. This tonnage was subsequently placed with a Buffalo furnace at $45 or $48.90, delivered. Buffalo furnaces have been able to make fairly free shipments over the Grand Trunk and Boston & Maine railroads. The Laconia Car Co., Laconia, N. H., purchased 300 tons of malleable at $45, eastern Pennsylvania furnace. A central Massachusetts foundry bought 400 tons of prompt 2.75 to 3.25 silicon from eastern Pennsylvania at $49, furnace. The continued railroad tieup has again caused considerable interest in southern iron for delivery by water to Boston and many small sales have been made during the week. Prices are on a $42 base with $5.75 freight to docks in Boston. With New England shipments some 50,000 tons behind on delivery to date, new inquiry is quiet.

Export Sales are Heavy

New York, May 24.—Export buying just at present is the most important feature in the pig iron market here. During the past week export business here totaled close to 10,000 tons and there are inquiries out for more than this total which are expected to be placed shortly. In fact, several inquiries for 1000 tons or more each are expected to be placed in the next day or two. A considerable portion of the export business of the past week involved Alabama foundry iron which was sold on the basis of $42, Birmingham, for 1.75 to 2.25 per cent silicon. The iron sold is to be shipped to a number of European countries.

There has been a marked letdown in the demand for pig iron from domestic consumers. Sellers say that consumers have been affected by the price-cutting reports in mercantile lines in the daily newspapers. Some consumers who have not yet bought for third quarter have decided to wait. The sellers, however, all feel that the pig iron situation is fundamentally strong and they point out the fact that by far the major portion of this year's production is sold up. The sellers feel that the near future is going to be characterized by higher prices. Prices, in fact, have shown a tendency during the past week to go higher. Fewer eastern Pennsylvania makers now are on the basis of $45, furnace, for 1.75 to 2.25 per cent silicon. One furnace now is $1 higher. However, eastern Pennsylvania foundry still can be had with ease at around $45, furnace, base, and both second half and prompt tonnage are obtainable at this figure. Some further business in eastern Pennsylvania foundry for second half has been done at $47, base, furnace. Central Pennsylvania foundry can be had for May-June shipment at $44.50 to $45, base, furnace, while some more business has been done by makers in that district at $47, furnace, for 2.25 to 2.75 silicon.

A fair amount of off iron has been sold in this district during the past week for prompt shipment around $43, furnace. Several hundred tons of Ohio malleable were sold for third quarter at $45, furnace. Some copper-bearing low phosphorus has been sold for second half at $47, furnace. A New England consumer is in the market for several thousand tons of low phosphorus iron.

Sell Southern at $44

Cincinnati, May 24.—Southern iron is scarce and there is a strong and increasing buying demand. The market is strong and higher prices are predicted. Two sales were made within the past few days to Ohio consumers of considerable tonnage of Southern No. 2 (1.75 to 2.25 silicon) at $44 Birmingham, and a smaller sale is said to have been made at $44.50 for early delivery. Buyers generally however are holding off, many of them maintaining that the prices at which this iron is being held is too high. It is said there is some iron still available around $42.50 and $43, but offerings at these figures apparently are scarce. The market is flooded with inquiries from anxious-buyers and more requests for iron are being received than at any time during the past several months. Actual orders are few however. The machinists strike in this disrict is dragging along and production has been cut down considerably. Only a few of the larger plants have been materially affected, most of them having been able to keep in operation, but a number of foundries have been idle and the effect is being felt generally. Shipping conditions have shown some improvement, and the movement of both fuel, and iron has been more satisfactory. Northern prices are strong but there is practically no iron available. Furnaces in the Ironton district have been increasing output but delayed contract orders have been taking up production to such an extent that little finds its way into the open market. Some year-end orders were placed recently for No. 2 at $44.50 Ironton furnace.

Order Books Are Closed

Buffalo, May 25.—The transportation difficulties have effectively tied up the iron market. The past week was not marked by a single transaction of importance. With one furnace out of the market since March with the exception of some basic selling, two of the other three interests are out as sellers, at least temporarily. Every effort is being made to get out the iron already sold, and from the present appearance of the

traffic situation, this will be no small task. Confronted by the practical impossibility to move iron, furnaces are resorting to piling metal generally and have closed their order books for the present. The uncertainty of delivery likewise has caused consumers to cease inquiring for new material until some measure of delivery is obtained on iron already sold. About the only sale during the week was 250 tons of foundry iron for last half delivery at $45, base. Furnaces are getting sufficient coke to keep operating and no interruption from this cause is feared, though the situation is not good.

Few Sales at St. Louis

St. Louis, May 22.—Little change is evident in the market for pig iron. A few scattering inquiries and small sales for third and last quarter delivery are reported as well as some small transactions for spot shipment, but the total volume is light. Producers are waiting patiently for the resumption of railroad traffic. Consumers, however, are by no means idle, and are trucking comparatively large tonnages at extremely high cost. Plant activity in the district proper has been well maintained, but unless there is some relief soon a radical turn for the worse must occur. Actual sales during the week total less than 1500 tons of all grades. Belleville foundries have taken some iron, that point not being affected by the embargoes, and several small lots were sold in Iowa. Most sellers are quoting $42 for No. 2 southern (1.75 to 2.25 silicon), but there is little doubt that this figure would be shaded to any purchaser with cash.

Southern Stocks Are Shrinking

Birmingham, May 25.—The pig iron market in southern territory is strong and sales continue to be made on the basis of $42, furnace, for 1.75 to 2.25 silicon. Some variation in the quoting of differentials from the base grade, however, has appeared. Some of the furnaces have turned away recently from the 4 per cent differential between grades adopted some time ago and have reverted to the Redfield schedule which means a somewhat lower figure. For example, 2.25 to 2.75 silicon under the 4 per cent schedule is advanced $1.68, while under the Redfield listing the addition is $1.25. Some companies are holding off from accepting fourth quarter business. Current sales range from carloads to 750 to 1000 tons. Little tonnage has been sold for shipment to Italy and other foreign countries. New bookings by the furnaces are more than equal of make. Southern pig iron is being shipped around the congested territory in the East for delivery in New England. Shipments also are being made to the Northwest and other sections where embargoes can be circumhanded. Stocks of iron in the South have been dwindling rapidly. The reduction in April from 147,000 tons to 91,000 tons on May 1 is expected to be continued this month. On May 1, 72,000 tons of foundry iron were on hand compared with 104,000 tons April 1; 8000 tons of machine cast foundry against 15,000 tons; 5000 tons of basic against 20,000 tons; and 5000 tons of warrant iron against 6700 tons.

Fail to Check Coke Prices

Large Producers Have Little to Offer at $12, while $16 and $17 Are Paid for Supplies—100 Carloads Sold at $14—New England Prices Raised

Pittsburgh, May 25.—Small coke producers, lacking regular consuming connections, and the brokers are the dominant interests in the present spot market. Larger producers have most of their production under contract and the little "free" tonnage they have for prompt shipment they are inclined to dispose of at $12, ovens, for either furnace or foundry grades. The attempt of these interests plainly is to hold the market in check, but they have not succeeded, as many blast furnaces and foundry interests in the east and in other sections of the country are now feeling the full effect of the railroad situation, and with them the price is secondary to getting enough fuel to keep plants going. Eastern interests have paid as high as $16, ovens, for prompt furnace coke and sales both in that section and also in the west have been fairly frequent at $15, ovens. Little business has been done in coke for consumption in this and nearby districts at above $13, ovens, and merchant blast furnaces generally are inclined to bank their stacks rather than go above $12, ovens. A large valley steelmaker paid $14 ovens for 100 cars of spot coke. Some spot foundry fuel also is moving as low as $12, ovens, but the bulk of sales range from $14 to $15, and occasionally $16 has been done. Railroads serving the Connellsville district generally are operating better, but lately have been running short of cars, not only because of the slow return of equipment but because the order of the interstate commerce commission has not yet brought back much of the open-top cars of eastern roads which has been in service for months on western lines. The car supply situation has affected both production and shipments and created a distinctly tight spot market. Last half business is held in check by the unsettled railroad and business situation. Operators would go ahead with such business, but consumers believe they will be able to make better terms later. Connellsville production of coke for the week ended May 15, is estimated by *The Connellsville Courier* at 154,400 tons, against 170,100 tons in the previous week.

Contract Price Advanced

New York, May 24.—Because of being forced to buy coal in the open market, the New England Coal & Coke Co. has advanced foundry coke to $15.50, ovens, for spot, and $15 for contract coke. It also has extended this price to existing contracts. Some of the New England consumers who, now will pay $17.40, delivered originally contracted at $11.90, delivered, and some at $15.40 and $16.40, delivered. It is very difficult to secure coke and but for heavy March shipments, and these gradually are reaching consumers, a great many plants would have had to shut down. However, April shipments were light and consequently not much tonnage is in transit. Some spot foundry coke last week was sold at $14, Connellsville but this figure now is low. Some spot foundry today was sold at $16 and $17, Connellsville.

Spot Foundry Sold at $16

Philadelphia, May 25.—Coke is hard to get, especially spot furnace coke for which $16, Connellsville, is asked. No sales have been made at the latter figure. Several sales of spot foundry coke have been made at $16, Connellsville. West Virginia makers are asking $14, ovens, for spot foundry.

Raise New England Prices

Boston, May 24.—Coke which up to the present has been fairly free from transportation difficulties in the New England district, has become scarce among foundries. The New England Coal & Coke Co., Everett, Mass., has had such serious delays in its supply of coal that its surplus has been nearly exhausted and large purchases of spot coal have been necessary to keep the plant running. As a result of this, its price has been advanced to $17.40, delivered, for spot and for nearly all contract coke. The May price on sliding scale contracts was previously established at $16.40, delivered, but the company has been forced to announce that the contracts for the remaining shipments during the month will take the $17.40 rate, the same as spot coke. Shipments of coke have been delayed in some cases, and foundries have a new obstacle to contend with. So far, the Providence Gas Co. has been operating at full capacity, although it is sold up to the exclusion of any new business. Freight embargoes prevent any beehive coke getting into New England.

Scarcity Extends Through West

St. Louis, May 22.—Several solid trainloads of coke have arrived from the east, and this has helped the local situation to some extent, but deliveries generally are still far behind. Many cars are started but few arrive. The general demand is very heavy. Many cokemakers doing business in this district have sold their entire quotas for the last half of the year, and little contracting is being done for that period. Urgent calls are coming from the west, where numerous foundries and smelters have been closed because of lack of fuel.

Continue to Make Shipments

Birmingham, Ala., May 25.—Demand still is strong for coke, and producers are getting high prices. Shipments continue to be made into the St. Louis territory, 72-hour coke selling at $12.50 per ton, f.o.b. ovens. Production will not be increased until the latter part of June, when the remainder of the by-product plant of the Sloss-Sheffield Steel & Iron Co. will be put in operation, and Tennessee Coal, Iron & Railroad Co. capacity will be greater.

Demand for Bars Calmer

Place Provided on Mill Books in West Relieves Consumers—Good Sales Reported from East—Nuts and Bolts Higher

Chicago, March 25.—Feverish demand for finished steel, particularly soft steel bars, has lessened and consumers appear to be much better satisfied with the situation than formerly. This is due in part to the policy of the leading interest in booking tonnages for indefinite delivery, giving consumers a place on mill books, which will result in their receiving steel when their turn arrives. In spite of the lessened demand for contracts, pressure for delivery keeps up and all consumers are anxiously requesting mills to get out their material and relieve their shortage. The leading interest is booking tonnages for regular customers, if they desire to take their chance for indefinite delivery. Books have not yet been opened for third quarter specification, which will mean delivery next year with a bare possibility of some of the material being furnished late in fourth quarter. Some preference is being given, where possible with justice, to railroads, frog and crossing manufacturers, car builders and manufacturers of agricultural implements, these being regarded as most essential. On soft steel bars the leading interest is quoting 2.62c, Chicago mill, while eastern independents in a position to furnish prompt material are quoting from somewhat above that figure to as high as 4.00c, Pittsburgh.

Manufacturers of bar iron find demand continuing strong and for the most part are taking business only from old customers. Demand on the part of railroads has slackened somewhat, probably as the result of lack of money. All small sections are now being quoted at 4.00c, Chicago mill, while larger sections are quoted as low as 3.75c, Chicago mill. Demand remains heavy.

For hard steel bars rerolled from rails quotations of 3.75c to 4.00c, Chicago mill, are being made for manufacturers, while reinforced concrete bars are commanding 3.75c to 4.50c, Chicago mill, the higher figure applying on earlier deliveries. Demand for this product is far in excess of mill production.

Demand Much Less Urgent

Pittsburgh, May 25.—While the demand for merchant steel bars still is large, it has lost much of the urgency it recently showed due to the fact that secondary manufacturers are operating less fully on account of the railroad situation. Some of the independent makers still are quoting 4.00c base and one company recently named 4.25c against some inquiries for structural bars, but 3.50c has been rarely exceeded on actual business. A minimum of 3.00c still is being quoted by a large maker. The Carnegie Steel Co. still is operating its bar mills at its Duquesne works but has only a few of its Pittsburgh or Youngstown mills running and is piling most of the output at Duquesne. Opening up of the Pittsburgh & Lake Erie railroad has enabled the Jones & Laughlin Steel Co. to move a considerable number of loaded cars. Iron bar makers still are quoting 4.50c base for common iron.

Some Sizable Lots Closed

Philadelphia, May 25.—Steel bars continue an exception among finished products. The mills say the demand exceeds their ability to book. Mill prices show no change. Individual orders include 3000 tons of bars at 4.00c Pittsburgh for shipment commencing in 60 to 90 days, 1000 tons of bands at 6.00c Pittsburgh for delivery commencing in 90 days, 1000 tons of deformed bars at 4.00c, and 1000 tons of cold-rolled bars at 6.50c. It is reported that because of inability to ship or receive materials Beaver valley cold-rolled steelmakers are not taking any business at present. Bolt, nut and rivet demand is very quiet.

Buyers Less Insistent

Pittsburgh, May 25.—Although the demand for cold-finished steel bars shows no material relaxation, there seems to be a full appreciation among buyers of the difficulties which confront manufacturers in the matter of shipments and the former are not pressing so insistently for deliveries. Automobile companies still are in the market for tonnages and a sale of 300 tons of hexagons in the smaller sizes is reported by one maker for reasonably early delivery at 6.50c, base. This marks the general maximum, although on ½ and 9/16-inch rounds 10.00c has been done and it is declared could be repeated on tonnages which could be shipped out immediately. One company in this district still is holding to a base of 4.10c for these bars and another is quoting 4.25c, base, but only small tonnages.

Falling Behind On Orders

Pittsburgh, May 25.—Makers of hoops and bands in this district have made no headway in reducing their obligations; on the contrary, they are further behind than they were a week ago as considerable difficulty still is experienced in moving billets to mills separated from steel works. One independent maker still is quoting 5.50c, base, on hoops and bands but is accepting business in steel suitable for automobile rim stock at the same base.

Situation Slightly Easier

Pittsburgh, May 25.—While plant operations of makers of nuts, bolts and rivets in this district still are decidedly below normal, they are somewhat better than recently due to a somewhat easier transportation situation. This has permitted larger shipments of finished material and has enabled manufacturers to secure more rods and bars.

Bolt Quotations Advanced

Chicago, May 25.—A number of producers of nuts and bolts have advanced their quotations about 10 per cent over the prevailing level, in an attempt to stop the tremendous inquiry which is facing them at a time when shortage of raw material is curtailing production.

Larger Lots

Of English Ferro Closed at $195 Tidewater—Some Spiegel Sales

New York, May 24.—Buying of ferromanganese has been on a larger scale during the past week than for several weeks past. One western consumer bought 500 tons of English metal and altogether the business of the past week totaled close to 1000 tons. This was done on the basis of $195, tidewater, for English ferromanganese for second half, $200 delivered, for domestic for second half, and $225 to $250, delivered, for ferromanganese for spot shipment.

Spiegeleisen demand also showed considerable increase. Sales of the past week aggregated close to 1000 tons, including mostly second half metal which went on the basis of $75, furnace, for 20 per cent.

Place More Stacks on Ferro

Philadelphia, May 25.—E. J. Lavino & Co., have placed their Sheridan furnace on ferromanganese, and have put their Reusens, Va., stack on spiegeleisen. The latter will go on ferromanganese early next week, making four Lavino furnaces on that metal. The market for ferroalloys is quiet. The Midvale Steel & Ordnance Co., has decided to postpone its contemplated purchase of 3000 to 6000 tons spiegeleisen.

Brazilian Shipments Increase

Philadelphia, May 25.—Shipments of Brazilian manganese ore are improving, more cargoes than usual being on the way to the United States. The market for Brazilian ore for early shipment is around 85 cents per unit, tidewater. The demand for spot ore is active, and ore already arrived probably would bring 90 cents.

Sales Few and Small

Pittsburgh, May 26.—Not much is goon in ferroalloys in this market, not that the demand is lacking but rather because of difficulties surrounding deliveries. Prompt tonnages of domestic ferromanganese generally are held at $250, delivered, but this price is a little extreme except for occasional carload lots. The last sizable tonnage of this material sold in this district for prompt delivery went at right around $240, delivered. Last half tonnages still are quoted at $200, delivered, with little business being done as buyers seem in no hurry to cover and makers are not pressing sales. Some fear is expressed here that the future may develop a considerable shortage of manganese ore.

Although spiegeleisen is quoted at $75, furnace, for 19 to 21 per cent material for both prompt and deferred shipments, no actual business has been done here at higher than $70. Offerings of this material for early delivery are exceedingly small.

Start Production At Chicago

Chicago, May 25.—Production of ferromanganese by a blast furnace stack at South Chicago has just been started and a moderate supply of this

alloy is available for prompt delivery during June. Sales for June delivery were not made until recently because of uncertainties of ore supply, but contracts can be made now at about $250, furnace. For last half contracts will be made at $200, while for definite portions of that period $225 is the figure. On some resale ferromanganese prices ranging from $235 to $250 have been made, but the volume of this business is small. Spiegeleisen is decidedly quiet, with quotations averaging about $75, eastern furnace.

Small Gain

Shown by Pipe Mill Shipments—Cast Iron Lettings Are Few

Pittsburgh, May 25.—The past week has seen a slight improvement in the movement of pipe from the plants in this district which have remained in operation but the gain has been nothing to talk about. The Pittsburgh & Lake Erie railroad has secured enough men to replace striking workmen to be able to give better service and a number of loaded cars at the Woodlawn, Pa., works of the Jones & Laughlin Steel Co. have been moved out. The National Tube Co. is moving, as it has for the past few weeks, approximately 50 per cent of its production. Both of these companies report full operations. No increase of pipe ..... operations can be reported in the Youngstown or Wheeling districts but the A. M. Byers Co. and Spang-Chalfant & Co. are doing somewhat better as a result of the larger supplies of raw material. Quotations are much as they have been recently, inquiries being numerous and urgent but with most companies out of the market. It is reported that one of the independent makers of steel pipe recently issued a new card on oil country pipe, increasing prices $10 per ton. Other makers are holding to their old cards. The Reading Iron Co. has not met the recent advance by the A. M. Byers Co., still quoting its old card rate dated Jan. 17.

New Business is Quiet

New York, May 24.—Small tonnages of cast iron pipe are being booked for shipment to Cuba and South America, but two or three large inquiries noted some time ago involving pipe for these countries, seem to have disappeared entirely. The business now booked is said to be going at prices quoted on domestic orders.

Cast Pipe Demand Small

Chicago, May 25.—Dullness continues in the market for cast iron pipe with few advertised lettings, the inquiry of the city of Akron, O., for 1800 tons of 48-inch pipe, on which bids will be opened June 1, being the only one of importance.

Pipe Demands are Heavy

Birmingham, Ala., May 25.—While sales are not heavy, the market for cast iron pipe in the South is still strong. Smaller sizes are most in demand. Pipemakers assert that because of the high price of pig iron it is not profitable to keep too much stock on hand.

Plate Market Confused

Prices Show Considerable Variation—Baltimore & Ohio Buys at 3.50c —Locomotive and Car Requirements Are Coming Forward

New York, May 24.—Although far from weak, the plate market in this district continues to reflect a rather confused situation, in that current prices show considerable variation. Several thousand tons of Lloyd's ship plates have been sold for export to Glasgow at a shade under 4.00c, Pittsburgh. Lloyd's ship plates, both for export and domestic shipment during the past week, brought 3.75c to 4.00c, Pittsburgh. A large locomotive company recently purchased 4000 to 5000 tons of plates at 4.00c, Pittsburgh, for boiler and fire box steel, and 3.75c, for tank and universal plates. The market on universals now may be quoted at 3.50c to 3.75c, Pittsburgh; tank plates also may be quoted at 3.50c to 3.75c, Pittsburgh, although the 3.50c price is unusual. The Baltimore & Ohio railroad which recently bought 15,000 to 20,000 tons of car material paid 3.50c, Pittsburgh, for the plates. Consumers in this district continue to have great difficulty due to the erratic railroad situation, and some consumers are able to get deliveries only in the most roundabout way.

Railroad Inquiry Expected

Philadelphia, May 25.—The plate market now ranges from 4.00c to 5.00c Pittsburgh for light gages, 4.00c for boiler and fire box, 3.75c to 4.00c for ship plates and from 3.50c to 3.75c for tank and universals. Of present demands locomotive requirements are most important but considerable railroad inquiry is expected out the next week or two for repair. Inquiry is out for 3000 tons of ¼-inch for export from the Pacific coast and for 12,000 tons of ship plates and 4000 tons of ship shapes while for a pipe line at Seattle new bids have been requested. Eastern output continues low due to the lack of coal and inability to ship. The mills report many buyers are holding up action awaiting a clearing up of the situation. One eastern maker says on account of advancing raw material, it is unable to reduce from the 4.00c price.

Demand Falls Off

Youngstown, O., May 24.—Demand for plates in this territory has fallen off considerably. Even though fuel conditions warranted normal operation, it is doubtful whether order books at present would schedule the mills further than a week or 10 days ahead. While some business is reported as having been taken at 3.75c, it is questionable whether more than 3.50c could be done right now.

Demands Not Especially Heavy

Pittsburgh, May 25.—Platemakers in this district are not flooded with inquiries, either of tank quality or for railroad equipment, shipbuilding or structural purposes. Fabricating interests, because of the slowing down in business due to the uncertainty as to deliveries and the stringency in the money market, are not so urgent buyers as they were a short time ago. Although some independent makers are holding firmly to 4.00c for tank plates, 3.75c appears to be the more general maximum and one leading independent is inclined to regard 3.50c as the base price on such business as is offered by regular customers. The Carnegie Steel Co. of course remains at 2.65c, base, but is taking little business unless it comes from a source having orders from the railroads.

Buy More Ship Material

Chicago, May 25.—In addition to the 27,000 tons of plates for oil tankers to be built on the Pacific coast, the builder has placed with the leading interest additional orders for about 2000 tons, the original estimate having been short. Other shipbuilding is not producing plate tonnage at present. Railroad carbuilding has brought orders to the same producer for about 6000 tons, mostly plates, for the repair of Illinois Central cars.

The leading interest is booking plate tonnages from regular customers for indefinite delivery at 2.92c, Chicago mill. The leading independent has some small tonnage of plates still unsold for indefinite delivery at 3.77c, Chicago mill. This material is sold on specification and no contracts are being made.

Buys Charleroi Plant

Negotiations for the purchase of the plant of the Universal Steel Co., Charleroi, Pa., by the Electric Alloy Steel Co., Youngstown, O., have been closed. Preparations for a general overhauling now are being made and officials expect to resume operations about July 1. The plant includes a 6-ton electric furnace, two crucible furnaces, and a 10 and 14-inch bar mill. The mill site covers approximately 13½ acres. The Electric Alloy Steel Co. has considerable bookings of alloy steel bars which will afford steady operation of the acquired plant until well toward the close of the year.

Plans Big Outlay

The improvement program of the Cambria Steel Co., Johnstown, Pa., which started last year and will probably run over the next two years, it is stated, will involve expenditures aggregating more than $40,000,000 and will include thousands of homes for workmen in its employ. It is announced that contracts recently were signed covering a complete by-product and motor benzol plant located near the Franklin ovens; additional coke ovens at the Rosedale plant and a complete new system of coke-handling machinery.

Scrap Prices Declining

Further Recessions Noted in Number of Districts as Demand Continues to Fall off—Transactions Limited Largely to Dealers—Few Railrod Offers

FOR COMPLETE SCRAP PRICES SEE PAGE 1578

Chicago, May 25.—Continued weakness marks the situation in iron and steel scrap at Chicago, and practically nothing is being done by dealers with the exception of some small purchases by consumers and some trading between dealers. As a result of this situation prices continue to decline, recessions of 50 cents to $1 per ton being made during the past few days. Even cast scrap, which has been fairly active and strong because of the pig iron situation, has been rather listless the past fortnight because of the strike of molders which has interfered with operation of a number of Chicago foundries. This has been settled and demand for cast scrap is expected to revive. The Burlington offers a list of 5775 tons, including 400 tons of No. 1 steel rail. The Rock Island offers 3500 tons.

New England Demand Lifeless

Boston, May 24.—A better movement of scrap to Pennsylvania consuming points has been reported during the last few days, but this has failed to strengthen the demoralized market. The New England consuming demand has almost ceased to exist and some grades have actually gone begging even without prices being mentioned. Sales have been remarkably few and the increased freight movement has been practically all on old orders. Stove plate has been more active than other grades, although the principal New England consumer still is able to buy from $30 to $30.50, delivered. No. 1 machinery remains low in the face of the great scarcity of pig iron. Several hundred tons of No. 1 cast was sold in the Boston district during the week close to $43, delivered to consumer. Concessions below this figure were made in some districts. Machine shop turnings and cotton ties have dropped approximately $1, but borings have held up and heavy melting steel in spite of quiet trading still is nominally at the old price. Steel car axles have been sold for export in fairly large tonnages and prices have advanced until some dealers have paid as high as $39, shipping point.

Rejections are Numerous

New York, May 24.—Freer movement of scrap in this district has made consumers somewhat exacting with regard to specifications, with the result that rejections at this time are greater than in many weeks. Mill yards at many points, it is said, are fairly swamped with material, which had been stored on cars and then held up due to the switchmen's strike and resulting complications. The release of this scrap has taxed the mills' handling facilities to the maximum. Prices all down the line continue weak, and in several descriptions declines of 50 cents to $1 have been made. Heavy melting steel is one variety to be affected, it now holding at $19.50 to $20, f.o.b. New York. Old steel shafting, mixed borings and turnings and a couple of grades of wrought material are among other descriptions to be reduced. These reductions, however, are for the most part nominal, for very little trading is being done.

Wants Axles for Export

Philadelphia, May 25.—Scrap transactions continue largely between dealers and consumers still are badly handicapped in operations by the coal scarcity and the railroad situation. Hence they do not want much scrap. Cast scrap continues exceptionally active as a good demand for this grade continues. A large dealer is offering $40 delivered Philadelphia, for steel axles for export.

Trading Remains Dormant

Pittsburgh, May 25.—Dealings in scrap in this market still largely are at a standstill due to the transportation conditions. Buyers are not especially anxious to take on something they cannot obtain and by the same token dealers are not pressing sales since they cannot make deliveries. Some steelmakers are showing interest in the market and would buy round tonnages of the open-hearth grades if they could obtain them at somewhere around $25 to $26, delivered, for heavy melting steel. Some business has been done at $25.75 and $26, but only small tonnages have been involved. Dealers declare that they could not take on round tonnages for future delivery at these prices and get out a profit. The market has evolved itself largely into a transportation affair and price movements during the next few weeks are likely to be dominated entirely by the ability of dealers to move materials they sell.

Buffalo Situation More Active

Buffalo, May 25.—Scrap dealers report conditions very much improved over last week. Shipments are going through with greater dispatch, and there has been a picking up of demand showing that the market is ready for business, as soon as transportation conditions justify. Dealers are getting a straggling supply of cars. Inquiry for heavy melting steel is reported from northern Ontario districts in Canada. A buyer there has offered $26, Buffalo, for steel. A local mill offers $24.50. So far as can be learned there has been no acceptance of the Canadian inquiry though an occasional car is being switched through to the local buyers. Embargoes still are operative on shipments to many eastern points. Prices are unchanged.

Cut Prices to Raise Cash

St. Louis, May 22.—The market for scrap iron and steel in this district continues virtually at a standstill. Consumers are purchasing a few small tonnages when given reasonable assurance of delivery, but there is little moving in or out. Mill and foundry operations are holding up fairly well, but these industries seem to have plenty of scrap on hand, or able to obtain delivery by truck. At the scrap yards the situation is discouraging. Financial troubles seem to be increasing for the dealers. Banks are becoming restless about loans, and dealers in many instances are not paying drafts, most of them asking 30 days for making settlements. Price lists show radical reductions, the credit situation being the most potent factor in the market. Many of the mills need scrap and would buy if they could get the material delivered. Railroads have quit attempting to market their scrap, and are not delivering what they have sold. The St. Louis Terminal association has a fair accumulation, but cannot ship it. Country dealers have not forwarded much material for weeks.

Market in South Quiet

Birmingham, Ala., May 25.—The scrap iron and steel market in the South is extremely quiet and with the exception of cast scrap no business is reported. Deliveries continue on old contracts, and dealers are keeping stocks sufficient to meet such demands. Prices have weakened but little, although no selling is reported. Consumers of heavy melting steel are [illegible] market.

Acute Shortage

Exists in Tin Plate with 2,500,000 Boxes Piled at Mills

Pittsburgh, May 25.—An extremely serious situation is developing in tin plate as a result of the interruptions to shipments created by the railroad transportation situation. While more mill capacity is in operation this week than at any time before since the outbreak of the strike and shipments are a trifle better than they have been, it is estimated that no less than 2,500,000 base boxes are piled up in the plant warehouses of the country awaiting shipment. Prospect of a reduction of these stocks is considered poor owing to the recent order of the interstate commerce commission sending all box cars into the western grain regions and the refusal of that body to permit the loading of these cars for the trip west. The position of the canners of perishable food has become so serious that a conference was held last week in Washington which was participated in by the canners and manufacturers of tin plate and cans, the result of which was the drawing up of a petition which was presented to the interstate commerce commission requesting relief through the immediate placing of cars for the shipment of accumulated supplies of tin plate to the container manufacturers, for the movement of cans to the canners, of fuel to the tin plate mills and of coal and coke to the steel works for the purpose of helping out the production of sheet bars. It was brought out at this meeting that the packers of perishable foods had only about 30 per cent of their normal supply of containers and that while the season was about two

weeks late because of the unseasonable weather conditions, immediate shipments of cans are necessary if considerable loss in packing is to be avoided. Marketwise, conditions are much as they have been recently with consumers pressing hard for deliveries but not meeting with much success in the lack of any real improvement in the transportation situation. The American Sheet & Tin Plate Co. is allotting last half production at $7 per base box and that price also is being quoted by independents who secure supplies of sheet bars from the Carnegie Steel Co. and have the benefit of the price of $42. Some business, however, has been done as high as $8.50 for domestic account for last half and export inquiries carrying prices of $11 or higher still are coming in.

Add Trucking Charges

Cleveland, May 25.—The transportation tieup still is the dominating factor in the local warehouse market and although most jobbers are able to get some material by the use of trucks, the amount is not nearly enough to meet the demand. One jobber who is trucking practically all of his material from Canton, O., has been forced to add the trucking charges, which is 50 cents per 100 pounds, to the price of his material

Movement is Better

New York, May 24.—Jobbers report an improvement in the movement of iron and steel products. They assert several carloads have been received by various warehouses respectively during the past few days, and that compared with the volume of arrivals during the preceding month or so, this is quite encouraging. At the same time, they are able to make shipments freely on most lines, with the exception of the New York, New Haven & Hartford railroad. Prices continue steady, and sellers, while reticent about making any predictions as to further advances, state rather flatly that there will likely be no declines until stocks are fully restored.

Defer Tie Opening

Pittsburgh, May 25.—Tendency of cotton tie makers still is to defer opening of the season until as late as possible with an idea of obtaining a clear line on the probable size of the cotton crop and thus be able to properly schedule rollings. Nothing very definite has developed as yet as to the probable size of the cotton crop but it is reported that the yield will be heavy this year provided sufficient labor is available at harvest time. It is believed that the opening price for ties will reflect both the present high market in hoops and the fact that with cotton at an unusually high price growers can afford to pay more than usual for this product.

W. R. McDonough & Co., Citizens building, Cleveland, is the sales representative of the Ward Tool & Forging Co., Latrobe, Pa., in the Cleveland district.

More Sheet Mills Running

But Deliveries Show Little Improvement—Buyers still Seeking Tonnage Actively—Valley Makers Have Little Material for Open Market

Pittsburgh, May 25.—Operations of the sheet mills are on a somewhat heavier scale than recently because of somewhat freer movements of fuel and steel in solid trainloads. The American Sheet & Tin Plate Co. at no time has suffered in its sheet mill operations as much as it has at its plants making tin plate. The Vandergrift, Pa., works of this company has steelmaking capacity and from this plant are served some of the Allegheny valley works of the company. Shipments both by this company and the independents, however, still are restricted because of the car situation. The fact that only a small portion of production is moving from the mills and further backing up of obligations, renders the supply situation exceedingly acute. At the same time, however, there seems to be a proper appreciation among consumers of the difficulties confronting the sheet manufacturers and while pressure for shipments is heavy, it is not unreasonably so. High prices continue to be paid against prompt and third quarter business going on the books of the independent companies, business in black sheets being reported at 7.50c and in galvanized at 8.50c, base. The American Sheet & Tin Plate Co. merely is allotting its production as it has since the first of the year, holding to the industrial board prices.

Buying Keeps Up Briskly

Philadelphia, May 25.—Sheets have continued a notable exception in the general finished market. Producers say they are frantic in trying to keep up with customers' demands. Mill prices are advancing. One eastern mill which has been quoting 5.25c to 5.50c, now is at 5.50c Pittsburgh minimum for blue annealed and is selling some November-December rollings at customers' solicitation. It has nothing to offer before. Mill prices on blue annealed range to 7.00c and higher. On the other hand, sheets originally bought for Japan are obtainable at resale at 6.50c Pittsburgh for blue annealed. Producers say because of railroad situation, consumers are trucking sheets from mills to distant points. It is learned here consumers are trucking sheets from Youngstown mills to points 400 to 500 miles away. In this connection it is interesting to note that Hamilton, Ont., consumer sent truck here last week for load of clutches out of jobbers' stock. One pass cold rolled sheets are bringing 8.00c to 9.00c, Pittsburgh.

Producers Out of Market

Youngstown, O., May 24.—All producers of sheets in the Mahoning valley remain out of the market and in the case of the large independent makers it is questionable whether any sheets will be available over the remainder of the year except to regular customers. Sheet bars have been coming from the mills here in heavy tonnages of late due to idle finishing capacity and buyers on contract have met with little difficulty in having their specifications filled. A few cars of coal and sheet bars go a long way toward maintaining sheet mill operations and practically every sheet producer here has been fortunate in getting both. This, perhaps, accounts for the steady operation at certain sheet mills here. The exacting problem, however, has been to obtain enough closed cars for shipments. Considerable tonnages continue to be moved by automobile truck.

The tendency of most makers here is to hold the price of black sheets where possible around the 4.35c base and other grades correspondingly. Few producers here have sold any sheets in the open market for several months and prices are indefinite. However, quotations on black can be placed between 5.50c and 5.75c, galvanized between 7.75c and 8.00c, and blue annealed between 4.75c and 5.00c on an average. A large percentage of black on order and now rolling was booked around 5.00c. Jobbers continue an active factor in the sheet market here. Their prices range from 9.50c to 10.00c for one-pass black, 9.25c to 9.50c for galvanized and 5.75c to 6.00c for blue annealed.

Demand Holds Strong

Chicago, May 25.—With both western producers of steel sheets fully sold and unable to take more business, demand continues very heavy and consumers are seeking large tonnages with little prospect of placing them successfully. The leading independent has sold as much tonnage for last half as it deems it possible to produce under the best circumstances and has retired from the market. Other independents in the East appear to be well sold and are not now interested in the western market.

Some Chain Extras Up

Pittsburgh, May 25.—Neither the American Chain Co., nor the United States Chain & Forging Co. has changed its base price on steel chain, those holding to 6.25c base as compared with 6.75c base, the quotation of several other makers. The United States Steel & Forging Co. however, has issued a new card dated May 10 in which the extras on conveyor and railroad switch and break chains have been increased $5 per ton. Extras on double-gripped chain have been increased $35 to $75 a ton. Chain makers in this district are somewhat busier than they have been, due to the fact that deliveries on bars and rods as well as plain wire have been slightly heavier than recently.

M. A. Collins & Co., bankers, 198 Broadway, New York, are offering the unsold portion of the present offering of a limited number of shares of the Sligo Iron & Steel Co. This company has 250,000 shares of no par value fully paid and nonassessable.

New Shape Orders Light

Slowing Up of New Construction Is General—Plain Material in East Sells at 3.10c Pittsburgh—Mills Close Because of Lack of Iron

New York, May 25.—Activity in the local structural market is confined chiefly to small tonnages. The principal awards of the week have been for apartment houses for this city, totalling 5500 tons. Fabricators report an easier situation at the shops, due to an improvement in transportation. Another shape mill of the Pencoyd, Pa., works of the American Bridge Co., probably will be shut down tomorrow night on account of the shortage of pig iron.

Little Demand in East

Philadelphia, May 25.—There is very little shape demand in the east. Attractive shape orders to be filled at mill's convenience could now be placed at 3.50c to 3.75c, Pittsburgh. Some business is going as low as 3.10c, involving material rolled but which cannot be shipped to intended destination.

Tight Money is Being Felt

Pittsburgh, May 25.—Tendency on the part of investors to defer placing structural contracts is quite as pronounced as it has been at any time recently. In fact, some interests declare this inclination to be even more pronounced than it has been and to ascribe this development not only to the uncertainty that surrounds shipments but also the fact that money is hard to obtain except at extremely stiff rates. A fair number of awards has reached local fabricating shops in the past week but as a rule these have involved very small tonnages. All of the shops in this district are running, though shipments of plain material except in trainloads are fewer. Shape mill activities are dwindling because of the inability to make normal shipments and the fact that storage space is practically exhausted. The 4.00c market in shapes appears to have pretty definitely disappeared and the one independent company which has been holding to this figure now is said to be in a receptive mood for business at 3.75c. Another independent company regards the market as 3.25c on structural beams, being influenced to a considerable extent by the fact that it comes in direct competition with the Steel corporation mills which still are quoting 2.45c.

Demand Shows Slackness

Chicago, May 25.—Slackening demand for structural material is noticeable. Frequently plans calling for steel are being changed to reinforced concrete with the idea of decreasing the cost. A number of large projects are being held back because of present excessive cost of construction, other factors than steel usually delaying the placing of contracts. The leading interest is booking material for indefinite delivery at 2.72c, Chicago mill. The leading independent has a small remainder of structural tonnage for delivery late this year which can be obtained at 3.52c, Chicago mill, where specifications are filed with the order.

CONTRACTS AWARDED

Boiler house for Cambria Steel Co., Johnstown, Pa., 1800 tons to the McClintic-Marshall Co.

Addition to Arnold Works, United States Aluminum Co., New Kensington, Pa., 300 tons to the McClintic-Marshall Co.

Two girder spans for the Louisville & Nashville railroad, 100 tons to the McClintic-Marshall Co.

Building for Ideal Electric & Mfg. Co., Mansfield, O., 300 tons to the McClintic-Marshall Co.

Sagger building for the Ohio Insulator Co., Barberton, O., 200 tons to the Jones & Laughlin Steel Co.

Addition to boiler house, American Rolling Mill Co. Middletown, O., 150 tons to the Jones & Laughlin Steel Co.

Shop building, junior high school, New Castle, Pa., 100 tons to the Jones & Laughlin Steel Co. through the Andrews Engineering Co.

Building for Maibohm Motor Co., Sandusky, O., 230 tons; to independent.

Extension to substations, Cleveland Electric Illuminating Co., Cleveland, 150 tons, to King Bridge Co.

Building for Ideal Electric Mfg. Co., Mansfield, O., 350 tons, to McClintic-Marshall Co.

Foundry extensions for the Kohler Co., Kohler, Wis., 120 tons to Milwaukee Bridge Co.

Evinrude Motor Co., Milwaukee, Wis., new foundry and machine shop, 340 tons to Milwaukee Bridge Co.

Lavine Gear Co., Milwaukee, Wis., addition to machine shop, 115 tons to Milwaukee Structural Steel Co.

Two bridges, Baltimore & Ohio railroad, 200 tons to American Bridge Co.

Addition to plant Aluminum Ware Mfg. Co., Elmira, N. Y., 200 tons to American Bridge Co.

Apartment house, Park avenue, New York City, 3500 tons to American Bridge Co.

Plant for General Chemical Co., in California, 270 tons to Llewellyn Iron Works.

Apartment house, New York City, 2000 tons to Phoenix Bridge Co.

Building for Bell Telephone Co., Philadelphia, 350 tons, to independent.

Ore trestle for Midvale Steel & Ordnance Co., Coatesville, Pa., 500 tons, to independent.

CONTRACTS PENDING

School No. 59, Bronx, New York City, 500 tons, contract pending.

Plant addition for Vreeland Motor Car Co., Irvington, N. J., 600 tons, contract pending.

Granada theater building, San Francisco, 850 tons, to Central Iron Works.

Filtration plant for the city of Pontiac, Mich., 448 tons, to concrete construction.

Turntables at Hannibal, Mo., for the Missouri, Kansas & Texas Railroad Co., 158 tons, to American Bridge Co.

Ten highway bridges in Texas, 240 tons, bids asked.

Theater and office building for Ascher Bros., Chicago, 200 tons, bids asked.

Station for public service commission, New York City, 250 tons, bids being taken.

South street bridge, Philadelphia, 1350 tons, bids being taken.

Better Shipments

Being Made in Wire Products but Congestion Far From Relieved

Pittsburgh, May 25.—While some of the independent makers of wire and wire products succeeded in making larger shipments last week, chiefly as a result of a partial restoration of service by the Pittsburgh & Lake Erie railroad, the general condition here was that more material was piled than shipped. Pittsburgh jobbers and those in nearby districts are not suffering much for want of supplies as they have been able to secure material by motor trucks. This has tended to reduce the demand from these interests, but distributors and manufacturers located at a distance have continued to seek tonnages. Only one of the companies here is entertaining third quarter inquiries but solely from regular customers and with the stipulation that shipments are subject to delay. One company which has been permitting regular customers to repeat orders to the amount of the completed tonnage, lately has withdrawn this privilege. Nails still are in big demand and also plain wire.

Consumers Modify Operations

New York, May 24.—Shipments of wire and wire products in this district seem to be around 70 to 80 per cent of normal. The chief complaints due to failure to obtain shipments, are heard from consumers of wire rod and manufacturer's wire.

Wire Shipments Better

Chicago, May 25.—Somewhat better supply of freight cars is allowing western nail mills to ship about equal to production, but does not yet allow any progress to be made in clearing up the surplus accumulated during the height of the strike. Tonnage being sent out is large as production is well up toward normal.

Some Cars

Continue to Be Placed by Railroads—New Inquiries Are Fair

New York, May 25.—The Havana Central has awarded 300 flat, 75 ballast to Standard Steel Car Co. but still is inquiring for 400 box. The Chicago Northwestern has placed 500 cars additional with the Pullman Co. The Gulf Smokeless Coal Co. has bought 400 ore cars from the Pressed Steel Car Co., and the Clinchfield Coal Co. 10 hoppers from the same builder. The Illinois Central is reported to have awarded repairs for 1000 gondolas and the Buffalo, Rochester & Pittsburgh for the repair of 1000 hoppers. The Pennsylvania Tank Car Co. has been awarded 200 tank cars by an industrial company. The Chesapeake & Ohio still is inquiring for 500 to 750 gondolas and Atlantic Coast Line for 500 miscellaneous types. The United Fruit Co. is inquiring for 400 cane cars. The Carnegie Steel Co. is inquiring for 500 hoppers. Railroad car inquiry at present appears to be confined principally to industrial companies, the railroads during the past week bringing out no new lists. Among the larger inquiries is that of the Humble Oil & Refining Co., involving 300 tank cars. A lot of 50 ore cars is being sought by the United Verde Copper Co., New York City. Included in orders are 100 hopper cars for the Union Gas & Electric Co., Cincinnati, and 10 cars for the New Jersey Zinc Co., New York City, all going to the Pressed Steel Co., and 17 tank cars for the Acar Mfg. Co., New York City, placed with the Pennsylvania Tank Car Co.

The Baldwin Locomotive Co., has taken an order for 10 locomotives for the St. Louis & Southwestern railroad.

Little Buying At Pittsburgh

Pittsburgh, May 25.—Not much is going on at present in rails and track equipment in this market. Railroads seem to have covered most of their

requirements of spikes and only occasional inquiries now are coming out. Makers are not particularly anxious for new business, having rather good sized orders, but are occasionally taking on small lots from railroads regarded as regular customers at 4.00c. Almost nothing has been done recently in standard rails but the Carnegie Steel Co. appears to have sufficient business to carry it along for several months while the Cambria Steel Co., which withdrew from the standard rail market several weeks ago on the ground that other steel products offered more profitable production, still remains out as a seller. The Carnegie Steel Co. is taking occasional orders for light rails from its regular customers at the old base of 2.45c but independent makers are not quoting less than 3.50c and as high as 3.75c, base, is being done by the Cambria Steel Co.

Car Buying Continues Light

Chicago, May 25.—Although railroads are badly in need of further rolling stock and numerous inquiries are pending, lack of proper finances is preventing these being converted into orders. In addition to its former inquiry for 1000 refrigerator cars, the Illinois Central railroad is inquiring for 200 flat cars and 50 passenger cars. The Baltimore & Ohio railroad is inquiring for repairs on underframes of about 800 cars, requiring 3500 tons of steel. The Lehigh Valley railroad is inquiring for two diners. The Illinois Central railroad has placed repairs on about 1500 cars with the Illinois Car & Mfg. Co., requiring about 6000 tons of steel, which will be furnished by the leading interest. Inquiry for standard steel

Semifinished Sales Few

Sheet Bars Show Considerable Spread—Mills Cleaning Up Old Obligations—Billets at $70—Foreign Demand Is Active

Pittsburgh, May 25.—New business in semifinished steel remains of moderate proportions due to the difficulties surrounding shipments on the one hand and the fact that curtailment of finishing mill operations because of the railroad situation on the other, has resulted in some consumers having some surplus supplies. A tonnage of open hearth, sheet bars recently under negotiation on a conversion deal at $90, Pittsburgh, has fallen through due to the fact that the tonnage involved was too small to appeal to the maker. Apparently there are two prices on sheet bars, depending on the ultimate use of the finished steel. Thus, while automobile and metal furniture manufacturers who have been seeking some tonnages for conversion have been quoted as high as $90, bars wanted for rolling into ordinary black sheets can be bought generally at $75 for open-hearth steel, this being the price idea of two of the larger independent companies. Bessemer sheet bars range about $5 per ton lower than open-hearth bars for the reason that they are not in as heavy demand.

Buyers who have recently sought to secure some rerolling billets found most makers disinclined to consider less than $75 for the standard size, but $65 to $70 covers the bulk of the recent sales. Slabs also are quotable from $65 to $70 and it is reported that an eastern platemaker whose steelworks are down as a result of the scarcity of fuel is negotiating with a western Pennsylvania maker for a good sized tonnage. Wire rods are still eagerly sought and readily salable. Independent companies quote soft rods from $70 to $75 for the base size, screw stock rods $85, high carbon rods from $85 to $100, and acid rods, $100.

Forging Blooms Wanted

New York, May 24.—Among inquiries for semifinished material in this district, is one for more than 1000 tons of forging blooms which are wanted by a large locomotive interest.

Prompt Rerollers At $70

Philadelphia, May 25.—Although the market for rerolling steel is not regarded by makers as above $60 to $65, Pittsburgh, some sales have been made for prompt delivery at $70, Pittsburgh. The market for forging steel is strong. Sales of forging billets and blooms have been made at $75 to $80, Pittsburgh, while $85 has been asked in some instances on smaller tonnages.

Small Billets Wanted

Cleveland, May 25.—Continued demand from abroad especially from England for 1½ to 2-inch billets is coming to producers in this district by whom recent sales were made at $75 mill. No additional orders have been closed however as makers are not much interested in new business because of the transportation situation.

Work Off Old Orders

Youngstown, O., May 24.—Due to the fact that many of the finishing mills here have been idle for a few weeks for want of coal for reheating slabs and billets makers have been converting a considerable tonnage of steel into sheet bars. This has afforded producers the opportunity of working off a large number of sheet bar orders from their books and it is thought when the time comes for third quarter buying, the mills will be in a position to consider additional business. While the completion of many sheet bar obligations has been advantageous in one way, still it has tied up finished capacity so tight that few steel companies here will have any finished material, with the exception of plates, to offer in the open market over the balance of this year. Bessemer sheet bars are quoted between $70 and $75 and the open-hearth between $75 and $80.

Urge Strip Deliveries

Pittsburgh, May 25.—Makers of strip steel still report that consumers are pressing them rather urgently for deliveries against orders and while unable to fully satisfy them, the fact that the railroad situation has eased down somewhat has permitted a slightly freer movement than recently was possible.

The Nonferrous Metals

	‡Copper	Future Straits N. Y.*	†Lead New York basis	Zinc St. Louis basis	Aluminum	Spot antimony	Nickel ingot
May 19	19.00	52.00	8.50	7.65	33.00	9.37½	43.00
May 20	19.00	51.50	8.50	7.60	33.00	9.25	43.00
May 21	19.00	51.50	8.50	7.60	33.00	9.25	43.00
May 24	19.00	51.75	8.50	7.55	33.00	9.00	43.00
May 25	19.00	50.50	8.50	7.55	33.00	9.00	43.00

*Future shipment from Singapore or London.
†American Smelting & Refining Co.'s price.
‡Producers, second quarter; July-August 19.25c.

NEW YORK, May 25.—Improvement in railroad conditions and somewhat freer movement of metal have improved sentiment a little, in the metal markets the past few days, although conditions remain so tangled that this improvement in feeling has not been translated into freer buying by consumers or stiffening in prices. The wave of reduced price talk which has been sweeping the country has not been much of a factor in the nonferrous metals. Zinc has sold down to 7.55c, East St. Louis, which is only about 1½c a pound over the average price for the last 25 years. Straits tin has been obtainable at 51.50c for future shipment and 52.50c for spot, which prices are lower than any since February, 1917, or since we entered the war. Copper is quoted 18c to 19c, whereas the average price for 30 years is about 15.75c. Lead is in somewhat better position from the seller's standpoint, being quoted 8.50c, New York, as against an average price for 30 years of about 4.65c.

Business in copper with domestic consumers has been almost at a standstill. Producers have maintained a nominal quotation of 19c delivered, for prompt, and June deliveries; 19.25c, for July and August. They have done some export business, for French account, under the newly devised credit plan. French consumers are being permitted to obtain terms of 90 days, with privilege of three renewals of similar periods. New York bankers are supporting the Copper Export association in this arrangement. Outside copper sellers sold electrolytic copper down to 18c, f.o.b. refinery, this week. Casting copper is scarce and quoted nominally 18c, New York. The strike situations in Butte and Waterbury show little improvement.

Prime western zinc has been in slight demand, regardless of price. Dealers have led the decline, offering metal for early shipment down to 7.55c, East St. Louis. Producers have sold at 7.60c. Brass special has sold all the way from 7.75c to 8.50c. High grade zinc prices also have been irregular, ranging all the way from 9.12½c, to 10.25c, New York.

The lead market has been steady, with May shipment metal scarce and with speculators selling June and July shipments down. The leading producer continues to quote 8.50c, New York, 8.25c, East St. Louis, while independent producers are quoting June shipments down to 8.12½c, St. Louis. The English market has been so low as almost to enable export business for shipment to the United States.

The tin market has slumped sharply under further declines in London, Straits tin dropping almost to 50c last week, for future shipment. On May 24, however, a stiffening in sterling exchange rates and a firmer tendency in silver, strengthened sellers' views about ¼c to ½c a pound. Consumers have shown somewhat more interest as tin reached the neighborhood of 50c. Spot tin has commanded a premium. Today it was 51.75c.

Export Inquiries Less Promising

Some Curtailment of Business on Present Price Basis Shown—France Buys Plates at Low Price—Europe Inquires for 20,000 Tons of Sheet Bars—South American Rail Bids Postponed—Spain Purchases Tin Plate

NEW YORK, May 24.—Considering the reports of price reductions in many lines being spread through the country, the iron and steel export trade has showed strength. While inquiries from abroad contain nothing spectacular except an active inquiry for 20,000 tons of sheet bars for last half, the total volume promises a healthy business. A fair amount of business also was signed up, but the question of price has been the one subject under discussion among the exporters. On business for foreign shipment it still is necessary to pay a premium over the domestic sales. These premiums are especially high if the foreign customer desires to hasten delivery.

Price Declines Reported

It is reported some mills now will sell galvanized wire at 6.00c, Pittsburgh and they are accepting orders for gages 8 to 12. These same mills will sell nail wire for 5.25c in gages 8 to 14. Blue annealed sheets which have been selling for export at 7.00c, Pittsburgh, have been sold at 6.25c. Tank plates now are selling at 3.75c, Pittsburgh, and less. On the other hand one house reported the sale of 10,400 kegs of nails to Cuba upon the basis of 7.50c, New York, which is the same price that has prevailed. France purchased 7500 tons of plates on the basis of 3.50c, Pittsburgh.

Exporters are doing all they can to protect the market against any wholesale unloading of material by the Japanese. The legitimate export houses have refused to accept bargains offered for resale by the Japanese, hoping thereby to absorb this material gradually at better prices as new foreign business develops. In some few instances this has been successful. One exporter sold some 107-pound tin plate last week at $13, base, Pittsburgh. A Japanese house is offering for resale tin plate of identical character at $12 c.i.f., Kobe. Another export house was offered 18,000 cases of tin plate by a mill at $10.95, Pittsburgh. This wide fluctuation in prices and quotations is indicative of the unsettled condition of the export market.

The trade is convinced that the Japanese market is dead and probably will remain so for the remainder of the year. The Scandinavian countries have been sending in many inquiries during the past week but no orders. They have asked for bars and plates in small lots, and tin plate. The inquiries for sheets from these markets have been large. The Spanish railway inquiries are looked forward to but the long delays in receiving the specifications have caused considerable discouragement. England has continued to send in plate inquiries, in 1000-ton lots, but exporters are now despairing of getting much more of this business. The price the English are willing to pay for plates is not the deciding matter just at present. The British shipyards are anxious to purchase where the quickest deliveries may be had, and deliveries in England are said to be much slower than in the United States. The Italian inquiry for billets has been extremely large and some exporters anticipate business. It is believed that the chances of doing business in Italy are better than in any other European country. Italy also is asking for plates, pipe and sheets, but for the moment it is impossible to sign up any orders. One house sold Spain 5000 boxes of tin plate last week. Greece has purchased 500 tons of iron bars.

With the return of Thomas W. Lamont from the Orient, after negotiating the international credit for China, a report was circulated that this deal is certain to result in large sales of American iron and steel in China. The first credit of $50,000,000 will go chiefly for railway development. The total sales of American iron and steel products in China last year did not exceed $13,000,000. Sales made on the basis of the projected bankers' credits probably will be some months in developing. China is asking for 1000 kegs of nails, and 250 tons of nail wire were sold. It has bought 200 tons of blue annealed sheets.

Wire has been selling in Australia, the Philippines and in India. India has also been asking for nails in large quantities. One house reported the sale of 1500 tons of wire, all of one gage, to Australia. South American business is said to be subnormal, developing a large demand for barbed wire at this time. Some wire and bars have been sold South America during the past week. Argentina most likely will develop a demand for American road-building machinery and agricultural implements. One export house reported the sale of 1000 tons of steel bars to Argentina, while another sold 10,000 coils of oval wire. Argentina is inquiring for some 75-pound rails.

Railways in Brazil are developing a demand for material in the United States. The government has just extended the roads a credit of $12,500,000, which exporters here are expecting will shortly develop orders. Among the sales to Brazil reported last week were 400 tons of nail wire, and 100 tons of black sheets.

Chile has granted an extension of time for bids on railway material. The demand is for rails, cars and other equipment for normal replacement. The Chilean state railways are inquiring for 30 mikado and 10 other locomotives of 5-foot gage, 20 mikado and one mallet locomotive of meter gage, 200 coal cars, 160 freight cars, 200 flat cars, 20 refrigerator cars, and 80 passenger coaches. At the moment an independent inquiry from Chile is out for 1500 tons of 50-pound rails. Colombia has developed a demand during the past week for bars for concrete reinforcing, the inquiries ranging in size from 100 to 200 tons each.

Cuba's most pressing demand is for equipment for the sugar industry. That country is asking for concrete reinforcing bars in small lots, and for rails of 50 pounds and up in size. One house reported the sale to Cuba of 2000 tons of 60-pound rails, and 1000 tons of 45-pound rails. Porto Rico has developed a demand for concrete reinforcing bars, and one house reported the sale of a small tonnage of medium-weight rails. Santo Domingo is asking for nails and galvanized barbed wire.

Machinery Club Elects

The Machinery Club of Chicago has elected new officers for the ensuing year as follows: R. R. Cuthbertson, president; John R. Porter, vice president; H. G. Reeve, treasurer, and A. G. Busch, secretary. C. J. Becker is assistant secretary. The annual meeting was held May 18, when reports were presented, and several changes in by-laws acted on. The club has grown largely in the past year and recently has taken over additional space, to accommodate the enlarged patronage.

Disagree on Ore Shipping Pool

Leading Operators Divided Into Groups, for and Against Adoption of Pro Rata Arrangement of 1918, as Recommended by Interstate Commerce Commission—Plan Will Fail Unless Order Is Issued—Competition Too Keen, Say Opponents

CLEVELAND, May 25.—Leading shippers of iron ore from the Lake Superior district have split on the question of pooling their interests and prorating tonnages according to furnace needs, and unless the interstate commerce commission issues an order to them to do so it is probable that the mere recommendation by the commission will fail of its purpose. Numerous meetings have been held in the past week by the shippers to consider the adoption of the pooling system in operation in 1918, but the meetings have resulted only in disagreements between one group, which strongly favors the commission's recommendation, and the other, just as firmly opposed. A letter defining the position of the two groups is now being drafted by H. M. Griggs, manager of the Iron Ore and Coal exchange, for forwarding to the commission, and in the meantime nothing is being done toward prorating ore supplies.

Considered from the standpoint of tonnage involved, the most powerful group of shippers is opposed to the suggested pool. This includes the Pittsburgh Steamship Co., subsidiary of the United States Steel Corp.; Pickands, Mather & Co., Cleveland-Cliffs Iron Co., Jones & Laughlin Steel Co., and McKinney Steel Co. On the other hand are M. A. Hanna & Co., Tod-Stambaugh & Co., Oglebay, Norton & Co., John A. Savage & Co., Harvey H. Brown & Co., Davidson Ore Mining Co., and Shenango Furnace Co.

On May 18 the interstate commerce commission recommended that ore and coal tonnage be handled through the Coal and Ore exchange the same as in 1918. It issued the following statement:

"The commission today advised the Coal and Ore exchange at Cleveland there is a present necessity for co-operation between carriers and shippers in handling coal and ore upon railroads and the lakes along the lines followed in 1918 by means of the creation of an effective coal and ore pool, suggesting that as an initial action the interested parties should re-establish immediately a similar arrangement to that in effect in 1918."

All ore shippers were in accord on the proposition of co-operating and encouraging the commission in its efforts to improve the rail transportation system, but when a statement was drawn up to the effect that the exchange would have the right to prorate carloads of ore in accordance with furnace requirements, an objection was made. Those opposed to this take the position that the emergency is not so grave as to warrant such interference with competitive conditions in the trade.

The upshot of this situation was that the group of ore shippers favoring the pool drafted the following letter to the ore carrying railroads, explaining their position:

"In response to a communication from the interstate commerce commission of May 17, we, the undersigned Lake Superior iron ore shippers, have made formal reply, which will be presented to you this morning by Mr. H. M. Griggs, manager of the Iron Ore and Coal exchange, indicating to you our position in this matter, and as Mr. Griggs will inform you, the other Cleveland iron ore shippers whose names are not attached, are not in accord with one of the main principles embodied in our reply. We feel it important, therefore, that you should be fully informed as to our position in the matter, and our reasons for arriving at the conclusions stated therein:

"During the period of the war just past, the government deemed it essential to take over and operate the railroads of the United States, and did so operate them, during which time, lasting some two and one-half years, it was not possible, for reasons with which we are all familiar, to keep the railroads equipped with the necessary open top cars and motive power which the increased production had demanded. In addition thereto, a large number of cars, which were built for and belonged to the railroads serving the blast furnaces and coal mines of the lower lake district, have been taken by roads in other districts to which they do not belong. This has all caused a shortage in the equipment necessary to move the 36,000,000 tons of ore required by the interior blast furnaces, and 25,000,000 tons of coal required by the coal companies serving the Northwest. Therefore, our conclusions are that in order to serve the interests of all of the interior blast furnaces equitably and fairly, that the actual ore requirements of each and every blast furnace be ascertained by the Lake Superior Iron Ore association, for the period from June 1, 1920, to June 1, 1921—taking into consideration ore already on hand at furnaces and on Lake Erie docks—such information to be furnished promptly to Mr. Griggs, manager of the Ore and Coal exchange, and that Mr. Griggs be given by the lake ore carrying railroads full power and authority to apportion the available car supply for ore loading in accordance with such actual furnace requirements as far as practicable currently, the season to be divided into suitable periods; with the proviso that at no time shall a furnace company be apportioned more cars than it can promptly unload.

"The interstate commerce commission advises us that, due to unusual causes already expressed, there is at present a shortage of cars to serve the so-called interior furnaces, to whom we have sold a tonnage of iron ore from the Lake Superior district, to be delivered at Lake Erie ports by boat and then, with the exception of a minor part, to be placed on stockpile at Lake Erie port—to be transported by rail to said furnaces to be unloaded; and we claim that in view of the exigencies to which they call our attention, and which they advise necessitate that unusual methods be pursued, that in justice to all, there should be vested in Mr. Griggs sufficient power and authority to apportion the available car supply on the basis of actual needs and requirements of such furnaces from June 1, 1920, to June 1, 1921, taking into consideration tonnages of ore on hand from previous seasons, and instruct him to so apportion the cars.

"We furthermore urge that such total car supply shall not be distributed on the basis of the ability of any company to take and store iron ore in excess of its actual requirements, or on the basis of vessel arrivals alone, because we feel that the railroads as common carriers should see to it that any shortage of equipment is fairly distributed among all patrons of such railroads.

"We also appeal, through you, to the interstate commerce commission to exercise their power to return to the railroads, serving the lake coal and the lower lake interior furnaces, the cars and motive power which belong to such railroads, which equipment was built and maintained for the purpose of serving such interests during the comparatively short period which the season of lake navigation compels the coal and ore to be moved.

"Prompt action is necessary and we urge that such action be taken today."

500,000 Tons Steel Piled in Pittsburgh District

Pittsburgh, May 25.—While the railroad transportation situation has improved so far as more operations are concerned, only in spots is the movement of freight to and from the steel plants in this district any better than it has been in the past five or six

weeks. The trouble of the railroads now is one of cars. Recent order of the interstate commerce commission sending into the West all box cars on eastern lines for the movement of grain has left roads serving this district quite destitute of this sort of equipment, at least for local freight. Meanwhile, the interstate commerce commission order for the return of all open-top equipment to the East for the shipment of fuel and basic materials has been without tangible results. Of the three important railroad systems serving this district, the Pennsylvania, the Pittsburgh & Lake Erie and the Baltimore & Ohio, only the latter is operating at all normally.

The Pittsburgh Steel Co. reports some improvement in its shipments and is operating a little heavier. With all of the other important producers in this district, additions to the accumulations are the rule, at least where operations have been maintained. Slowing down in plate and shape mill operations has prevented further increases in the piles.

It is doubtful if plant accumulations of tin plate ever before were heavier than they are at present. A careful canvass of the situation discloses that approximately 2,500,000 boxes, equal to 125,000 tons of tin plate, which would require about 3700 cars to move, now are packed and ready for shipment at the various plants of the country.

The leading independent in this district has at least six weeks' production of wire and wire products piled up waiting shipment, and it is believed this is a typical condition. Accumulations of sheets have been heavy and the leading producer of semifinished steel in the Pittsburgh district has huge stocks waiting on cars. While definite figures are lacking in all cases, enough information has come out to give basis to the assertion that well on to 500,000 tons of steel are piled up in Pittsburgh district plants alone.

Operations in Mahoning Valley Improve

Youngstown, O., May 24.—Steel production at various plants in the Mahoning valley has improved. Coal has arrived at certain plants, warranting the placing of additional steelmaking units and finishing mills in operation. An annoucement last week that the Republic Iron & Steel Co. would start a few finishing mills Monday brought several hundred men to the mill gate seeking employment.

Two bar mills at the Brown Bonnell plant of the Republic Iron & Steel Co. were started today. This plant has ben idle since April 10, although for 20 years prior to that steam never had been shut off. Open-hearth production at the plant of the Brier Hill Steel Co. was increased 50 per cent, six furnaces now being charged as compared with three last week.

While complete suspension of the 15 open-hearths at the Ohio works of the Steel corporation continues, operations were resumed at the McDonald and Upper and Lower Union mills. In the upper part of the Mahoning valley, operations also show a slight improvement. The A. M. Byers Co., now has the blast on its stack for the first time in over three weeks, but continues to operate its puddling department below normal. The Trumbull Steel Co. increased its open-hearth output by putting on two additional furnaces, making five out of seven now on line. At its Liberty plant seven of 10 tin mills now are active.

May Bar Exports

London, May 25.—*(By Cable.)*—The French industrial strikes virtually have collapsed as the result of the firm government attitude. The French minister of commerce is expected to issue a decree prohibiting pig iron exports. France exported 121,000 tons of pig iron in January to April inclusive compared with 99,000 tons in the same period in 1913.

Takes Over Works

H. R. Feldstein, formerly assistant plant manager of the Carnegie, Pa., works of the McClintic-Marshall Co., and R. M. Collins, who was identified with the sales department of the McClintic-Marshall Steel Supply Co., have taken over the Reliance Boiler Works in the Woods Run district of Pittsburgh and will operate the works under its old name.

Chicago Molders Return

Chicago, May 25.—After an unsuccessful attempt to repudiate the agreed scale of wages negotiated by employers and officials of the molders' union, strikers in 30 Chicago closed shop foundries have returned to work, accepting a scale of $8.40 per day of eight hours as formulated and approved May 1. A radical element sought to discredit union officials and managed to call out the remainder of the molders. An ultimatum by employers and efforts of union officials caused the men to return, though a few still remain out. This is an advance of $2 per day over the previous wage, and is said to be the highest rate of pay for this class of work in the United States.

Housing Problems

Discussed by American Society of Mechanical Engineers

St. Louis, May 25.—(By Wire)—Industrial housing and methods for appraising industrial property and utilities were the chief problems discussed Monday and Tuesday at the sessions of the spring meeting of the American Society of Mechanical Engineers.

In a paper on "Price Levels in Relation to Value," Cecil F. Elmes, Sanderson & Porter, Chicago, showed that the dollar with purchasing power of 100 units in 1896 had only 77 units in 1904, 65 in 1912, 53 in 1916 and 26 in 1920. In the same years wages of common labor were 17, 28½, 40, 42½ and 70 cents an hour respectively. Therefore, the purchasing power of labor has increased from 185 to 250 units in 24 years.

The nation must build 3,340,000 homes to re-establish the average of 115 families to every 100 homes that existed prior to the war, declared Nelson R. Cunliff, of the St. Louis chamber of commerce.

Leslie H. Allen, Springfield, Mass., said that co-operative housing was the only solution for the home shortage. The association endorsed the Jones-Reavis bill providing for a department of public works where all government engineering work would be centered. The next spring meeting will be held in Chicago.

Forging Billets at $85

Philadelphia, May 25.—(By Wire.)—Two thousand tons of forging billets for delivery commencing in 30 days sold this week at $85, Pittsburgh. A lot of 1000 tons of rerollers, including 4 x 4-inch, sold at $70, Pittsburgh for similar shipment.

Independent makers are taking some orders for tin plate for the second half from regular customers at $8 to $8.50 per base box, Pittsburgh and are having no difficulty in selling tin plate off stock lists at $9 to $9.25.

Buys Coal Land

The Koppers Co. with an idea of assuring itself of sufficient and constant supplies of coal for the operation of its own by-product plant recently concluded the purchase of the Harlan Coal Mining Co., the Elick Branch Coal Co. and certain properties owned in fee by the Asher Coal Mining Co. at Coxton, Ky. The purchase involved 2700 acres of by-product coal.

British Buying Heavily at Home

Place Huge Orders for Billets at Increased Prices When They Find It Impossible to Obtain Steel in America—Order for 35,000 Tons of Rails, However, Placed in United States—Steel Output Declines—Pig Iron Prices Advanced

The Iron Trade Review Staff Cable

European Headquarters,
THE IRON TRADE REVIEW,
16 Regent St., S. W. 1.,

Sterling—$3.85

LONDON, May 25.—British steel works are accepting heavy orders for billets. Among recent contracts placed is one for 10,000 tons. Small steel sheet bars are almost unprocurable, while Scotch steels generally are £1 ($3.85) higher. Midland makers have advanced the price of steel bars to £34 ($130.90). The impossibility of obtaining American steel is said to be the chief factor in the increase in current British prices.

An increase in the production of pig iron and steel over the April rate is foreshadowed. Much new steel plant capacity is approaching completion. Two more blast furnaces have been blown in in Lancashire, and a third is preparing. The total now blowing in the country is 273, an increase of 10 in the month. Most of the iron and steel works in Staffordshire have been idle for three weeks due to a strike of canal boatmen, but they are likely to resume operations this week.

Northamptonshire pig iron has advanced 15 shillings ($3.85) and a similar advance is likely to be made soon in Derbyshire and Staffordshire. Coke has advanced 7 shillings ($1.34). A shortage of fuel is still restricting production. Exports of pig iron are severely limited.

A contract for 35,000 tons of rails has just been placed in the United States.

Foreign Inquiry Subsides; Prices Are Steadier

European Staff Correspondence

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,

Sterling $3.87

BIRMINGHAM, Eng., May 10.—Outside the Scotch district prices are steadier, due, it has been suggested, to a falling off in foreign inquiry. This relaxation is ascribed in part to the state of the foreign exchanges, and also to the deliberate holding up of some large enterprises which are considered to be impossible at present prices. South of the Tweed prices are steadying, but in the Scotch district they continue upward. Scotch prices appear to need adjustment two or three times a week. This is due, first of all, to the great demands of the shipyards, and, secondly, to the severe restriction placed upon general supplies by the linking up of certain large concerns, like the Steel Company of Scotland, with great shipbuilding syndicates. The shipyards are full of orders, but the shipowners are talking pessimistically about falling freight rates, and this eventually may affect the demand for new ships.

There is no relaxation in the home demand for steel, although this is the department in which the greatest progress is being made in mass production. At the recent Birmingham meeting, there was still keen buying of billets at prices ranging between £25 10s ($98.69) and £27 10s ($106.43). Several steelworks are still declining new business.

For the time being, the market is steadier in finished iron. The recent advances have brought the nominal nearer to the actual price than has been the case for a long time. Apparently the makers have not quite made up their minds as to the meaning of the new extras for small sizes, as their quotations vary in some cases as much as £3 ($11.61) per ton. A number of them are being asked to requote.

These increased extras became inevitable because the workmen considered they were not properly paid for the loss of tonnage in producing small sizes, with the result that it was becoming impossible to purchase ¼ or ⅜-inch bars.

In the Black country, the great trouble is short production.

The most serious deficiency is in pig iron, all the blast furnaces being hampered by coke scarcity. Two large furnaces at Netherton, about six miles from Birmingham, ready weeks ago to produce basic pig iron, are still idle, awaiting sufficient coke to make a start. Numerous furnaces all over the country are slacking occasionally, through want of coke. At the same time, furnace owners evidently are hopeful of better conditions, as several furnaces are being made ready to operate, including two at Maryport, in Cumberland. At present 16 are blowing in Cumberland, and seven in North Lancashire. At the time of the armistice 31 furnaces were in operation. At present, foreign inquiry in that district, which represents a large tonnage, is turned down. America is said to be a good buyer of ferromanganese from that district. Barrow is doing well with its rail trade, the mills having orders enough to keep them running to the end of the year.

There has been a slight recovery in coal output, the total production during April 24 having been 4,989,666 tons, the largest since May, 1919. If the miners will keep up this rate of output, some relief from the fuel stringency should be apparent soon.

A report has just been issued showing that 282 blast furnaces were in operation at the end of March, an increase of 22 in three months. It is significant, however, that the North East coast has no share in this increase, the total number blowing having fallen from 66 to 65, of which 22 are on Cleveland foundry iron, 22 on hematite, 16 on basic, and five on ferromanganese.

Midland sellers of pig iron still are binding their customers to pay prices current on delivery.

A marked increase is apparent in the demand for scrap, due largely to the shortage of pig iron. A couple of months ago, consumers in the Birmingham district agreed not to pay more than £8 15s ($32.85) per ton for either iron or steel scrap. The scrap dealers apparently were unable to get a price agreement, but the great demand eventually settled the matter for them, as £10 10s ($40.64) is now easily obtained for scrap iron, with £11 ($42.57) for steel scrap, and there is no difficulty in selling all the material available.

Current Iron and Steel Prices of Europe

British Market

Corrected to Date by Cable

Domestic and Export. Gross Tons at Works

SEMIFINISHED STEEL

	£ s d	$
Billets, soft steel	31. 0.0	100.10
Sheet bars	29. 0.0	111.63

FINISHED STEEL

Steel bars, England, ½ to 3 inch	31. 0.0	119.35
Ship plates, England	25. 0.0	96.25
Ship plates, Scotland	28. 5.0	108.76
Beams, England	20. 1.0	77.96
Beams, Scotland	28. 0.0	107.80
Sheets, black, 24 gage	32. 0.0	123.20
Sheets, galvanized, 24 gage	56. 0.0	215.60
Rails, 60 lbs. and over	21. 5.0	81.81
Tin plate, base box, 108 lbs.	3.14.0	14.25

PIG IRON*

Hematite, Scotch	10.10.0	40.43
Hematite, East Coast Mixed Numbers	13. 0.0	50.05
Middlesborough Basic	11. 7.6	43.79
Middlesborough No. 3	10.17.6	41.87
No. 3 Foundry, Derby, Leicester, Nottingham	10.13.6	41.00
No. 3 Foundry, Northamptonshire	11. 5.0	43.31
No. 3 Foundry, Staffordshire	10.12.6	40.91
Scotch Foundry	13.15.0	52.94
Ferromanganese, 80 per cent	37. 0.0	142.45

*Pig iron quotations are f.o.b. furnace for delivery in the United Kingdom. Export prices generally are subject to free negotiation.

COKE

Yorkshire furnace	3. 5.0	12.51
Yorkshire foundry	4. 0.0	15.40

French Market

Prices Last Reported

PIG IRON

	Francs per metric ton (2205 lbs.)	$
Hematite, Lorraine	840 to 890	51.49 to 54.66
Foundry, Longwy, 3 per cent Si., sand-cast	590	36.17
Foundry, Longwy, 3 per cent Si., chill-cast	640	39.23
Foundry, Longwy, 2 per cent Si., sand-cast	587	35.98
Foundry, Longwy, 2 per cent Si., chill-cast	620	38.01

COKE

French furnace	245	15.09
German, Belgium and British furnace	275	16.86

SEMIFINISHED STEEL

Blooms	945	57.93
Billets	945	57.93
Sheet bars	1195	73.25

FINISHED STEEL

	Francs per 100 kilos (220 lbs.)	$
Merchant bars	145	8.89
Angles	145	8.89
Normal beams and profiles	140	8.58
*Plates bridge and tank, 5 millimeters and thicker	158	9.70
*Sheets, black, 3 millimeters	171	10.48
Bars, cold-drawn, 40-60 millimeters round	200	12.26

Pig iron prices are f.o.b. furnace; semifinished steel prices f.o.b. works; finished steel prices, according to the schedule of the Paris Consortium of Iron and Steel dealers, delivered, except (*) which are from schedule of the Comptoir des Toles.

Belgian Market

Prices Last Reported

PIG IRON

	Francs per metric ton (2205 lbs.)	$
Foundry, 3 per cent silicon, Belgian	850 to 900	55.00 to 58.23
Basic-bessemer, Luxemburg	885 to 900	57.26 to 58.23
Basic open-hearth, Luxemburg	800	51.76
Foundry, 3 per cent silicon	850 to 900	55.00 to 58.23
Basic, open-hearth, Belgian	800 to 825	51.76 to 53.38

SEMIFINISHED STEEL

Blooms	1150	74.41
Billets	1200	77.64
Sheet bars	1250	80.88
Wire rods	2000 to 2100	129.40 to 135.87
Standard rails	1550	100.29

FINISHED MATERIAL

	Francs per 100 kilos (220 lbs.)	$
Merchant bars	145 to 150	9.38 to 9.71
Normal beams and profiles	150 to 155	9.71 to 10.03
Plates, 5 millimeter and thicker	160 to 175	10.35 to 11.32
Sheets, black, 3 millimeters	190 to 200	12.29 to 12.94
Sheets, galvanized, 3 millimeters	380 to 400	24.59 to 25.88

*Sold on same basis as semifinished material.

All prices f.o.b. furnace or works, except finished material, for which delivered prices are quoted

For the time being, American supplies of steel have become negligible. Some selling agents in London who appear to have come over specially from America to do business circulated elaborate lists of steel, which they stated they were ready to sell. They opened negotiations, however, by inviting buying merchants to make offers, which the latter declined to do, they in their turn asking for definite quotations. These have failed to elicit a response. The general conclusion at present is that America has very little material to sell.

Surplus shell steel, accumulated after the armistice, has figured prominently in the steel business for several months. A great deal of it has found its way to Birmingham as a substitute for mild steel, which nearly is unobtainable. It is believed, however, now that the ministry has made its last sale, and this material disposed of.

The Welsh tin plate trade is finding a quieter demand than for some months past, chiefly in regard to continental business. The upward trend of prices has been arrested for the time, recent business having been on the basis of 72 shillings ($13.93) per box. Some buyers have been endeavoring to get 68 shillings ($12.38) f.o.t. at the works, accepted, but, as the mills have fair reserves of orders, they are not disposed to look at this figure. Sheet bars are about £30 ($116.10). For galvanized sheets £56 ($316.72) is still quoted for 24 gage corrugated. The production has been a little improved by the starting of two Lancashire mills turning out a total of about 200 tons per week.

The large extension of forging plants during the war increased the general capacity for beyond peace requirements, so that a number of large forging establishments are operating only partially. The forgers are hoping that as shipbuilding gradually extends, and as the engineering trades develop, and it becomes possible for other users of forgings to take their full share of foreign business, the forging plants will gradually get enough work to do. The situation, however, is considered unsatisfactory at present.

Belgian Market Shows Upward Trend

European Staff Correspondence

BRUSSELS, May 5.—The Belgian metal market, following that of France, has manifested an upward tendency again. Blooms at 1150 francs ($69.46) a ton and billets at 1200 francs ($72.48) are no longer obtainable, and it is evident that the market is waiting readjustments which can hardly be less than 100 francs ($6.04) a ton upward, assuming that Belgian producers take advantage of competing offers in European markets. An increase of 30 francs ($1.81) for 100 kilograms (220 pounds) already has been announced for sheets

Franc—$0.0604

of 4 millimeters in thickness, although no change has been made in sheets of 3 millimeters, presumably because none are offered. Rails are quoted at 1550 francs ($93.62) a ton and profiles a like figure, whereas neither was offered in the open market a week ago.

An encouraging feature is the fact that coal production for the month of March was 5 per cent over the average of before the war.

May day passed off with a minimum of disturbance, and complete calm reigns throughout the country, which fact will enable Belgium to make quicker progress toward high production than France, where five days after the general strike broke miners and coal handlers on the docks are still out.

Metallurgical coke still remains at 117 francs ($7.07) a metric ton in Belgium. Coking coal of the middle grade is quoted at 77 francs ($4.65) a metric ton and fine qualities at 82 francs ($4.95).

French Prices Increased 14 Per Cent

European Staff Correspondence

PARIS, May 5.—The rise in the price of coke for metallurgical purposes has resulted in an average increase of 14 per cent in the prices of finished and semifinished iron and steel products. The Comptoir des Toles announces a new price of 158 francs ($10.65) per 100 kilograms (220 pounds) for plates and 171 francs ($11.53) per 100 kilos for sheets, increases of 80 and 250 francs ($5.39 and $16.85) per ton respectively. Coke was increased 90 francs ($6.06) a ton. Production at the mills of the Comptoir combination is but 200,000 tons per month as against a possible 600,000.

Now that the San Remo conference has cleared the atmosphere it is obvious that a more optimistic outlook is justified. Germany is to be made to agree upon a lump sum of indemnity and to give guarantees that 20,000,000 tons of coal per year will actually be forthcoming in accordance with the terms of the treaty.

The new prices of metallurgical

Franc—$0.0674

coke, from 245 francs to 275 francs ($16.51 to $18.53) a ton, may present handicaps to the metal trades, but the demand is insistent. The chief difficulty is production and delivery.

Import Embargo Lowers Exchange

Dollar exchange fell off a franc in the Paris market in a single day with the announcement of the government's policy for an embargo on imports. Some 1500 products are on the list, ranging from metal household utensils to automobile frames. Imports last year were valued at nearly 30,000,000,000 francs, while the value of exports was but 9,000,000,000. The figures for the first quarter of 1920 were somewhat more favorable as to exports but were proportionately larger for imports. It was to encourage home industry at the high local prices ruling, and an effort to raise the value of the franc in the world's financial markets that the measure was taken.

Coal and coke deliveries, although increasing, are far from normal, and 50 foundries in the Lille, Turcoing and Roubaix districts have again shut down, with the statement that they will not open until the government actually makes arrangements which will enable them to accumulate stocks. Intermittent production adds to manufacturing costs, it is claimed.

There have been rumors recently that new manufacturing facilities of the Creusot company will bring prices of finished products down. A new financial affiliation has been developed between Creusot and the Bank of the Parisian Union whereby 75,000,000 francs are to be available immediately for increased production. There was considerable conjecture as to what this meant until it was learned that it was done on behalf of Creusot interests in Czecho-Slovakia, which are not in the least likely to bring down prices in France.

New Increases Are Forecast in Austria

Special Correspondence

VIENNA, May 1.—Iron and steel prices which lately have shown some tendency toward weakness may again turn upward as a result of the new advanced coal and coke prices that have been fixed for the Ostrau-Karwin district, from which the necessary fuel for the Austrian steel industry is chiefly obtained. These new prices take effect at once. Large coal has been advanced from 19.50 Czech crowns ($0.302) per 100 kilograms (220 pounds) at the mine, to 31 Czech crowns ($0.48). This does not cover the entire extent of the advance since the coal tax will bring the figure up to 39.50 Czech crowns ($0.61). As a result, foundry coke, it is expected, will fluctuate between 53

Austrian Crown, $0.005

and 58 Czech crowns ($0.82 and $0.90) per 100 kilograms without the coal tax of 30 per cent. Furthermore, on May 16 the Czech railroads will increase the freight rate on coal 150 per cent. This latter undoubtedly will result in further advances in the cost of iron and steel making in Austria.

The annual meeting of the Alpine Montan Gesellschaft was held April 26. This is one of the largest producers in the country. It was stated at this meeting that the production of ores and pig iron had been reduced "to a theoretical bottom level." During the past year only one blast furnace has been in operation at the Donawitz works and even this furnace has been banked for considerable periods owing to want of coke. At the present time, the management of the Alpine Montan Gesellschaft states that it is impossible to determine when production will improve. Great efforts have been made to get larger quantities of coke from Germany and Czecho-Slovakia, without result. Iron and steel production in Austria has been further unfavorably affected by a railroad strike, during the middle of April, together with an 8-day general industrial strike. The latter came to an end on April 28.

A representative of J. P. Morgan & Co., New York, is in Vienna investigat-

Czech Crown, $0.0155

ing the methods of assisting in the rehabilitation of Austrian industrial life. It is understood that loans of raw material rather than money are being considered and it is hoped that a scheme will be worked out whereby Austrian factories will be furnished with raw materials with the understanding that the products will be exported to the United States. It is understood that some consideration also is being given to cash loans to groups of related industries or associations. In this connection the direct purchase of English and American coke is being out of the question on account of the low state of Austrian exchange, it has been suggested that an arrangement might be made with the Alpine Montan Gessellschaft whereby this concern would be supplied with 1000 cars of coke a month, in payment for which it would guarantee a certain number of cars of pig iron as well as a certain amount of finished steel, part of the pig iron being left for the payment of wages and for domestic use.

It is feared that a fresh advance in pig iron prices will be necessary in Czecho-Slovakia, despite the fact that quotations for the second quarter of 1920 already have been fixed. These advanced quotations, it is believed, will result from the considerable increase, in coal and coke prices, as well as railway freight rates which have been ordered. The Schneider interests of France have purchased the majority of the stock of the Berg & Huttenwerks Gesellschaft. This new purchase adds considerably to the Schneider interests in the Bohemian iron trade, since this great French firm already has acquired a large influence in the affairs of the Skoda works and the Vereinigte Maschinenfabriken. The latter controls the largest machine shops in Czecho-Slovakia. The Berg & Huttenwerks Gesellschaft gives the Schneider interests a foothold in Czech iron and steel industry, this concern having its works in the plebescite zone of Teschen. The blast furnaces, which were considerbly enlarged during the war, are located at Trzynietz. Additional blast furnaces are found at Ustron. There is also a rolling mill in the neighborhood of Mahrisch-Ostrau. In addition the Berg & Huttenwerks Gesellschaft controls extensive coal mines near Karwin, Peterswald and Oderfurt.

The Skoda works is negotiating with the Roumanian state railways for the construction of a number of locomotives. The total requirements of the Roumanian railways are estimated at 4000 locomotives. A new plant for the construction of railway cars and agricultural machinery is being erected at Mahrisch-Ostrau. Eventually it is hoped this new works will give employment to 12,000 men. Some of the first units are to commence operating in November of this year. The Czech government has promised orders sufficient to keep the initial units busy for five years.

Ford's Furnace

At River Rouge Blown in—Second to Be Ready in 30 Days

Detroit, May 25.—Henry Ford & Son's first blast furnace in the westerly city limits of Detroit, was blown in last week, Henry Ford II, 3-year-old son of Edsel Ford, performing the ceremony of igniting the first blast.

Iron from the furnace already is being cast for use in construction of automobile and tractor parts. The second furnace will be completed and ready for operation within 30 days. Both furnaces will have a daily capacity of 1000 tons. Foundations are in for three additional furnaces at the River Rouge plant.

The Ford motor and tractor plants consume approximately 3000 tons of steel and iron daily, and it is planned by Mr. Ford and his son to so develop the new plant that it will take care of all requirements of their manufacturing interests. Ore will be brought direct to the River Rouge plant from the Lake Superior mines in boats owned by the Ford organization.

Until the foundry, which is to be one of the largest in the world, is completed, iron from the new furnaces will be sent to the Highland Park plant to be remelted. In the proposed foundry the iron will be used direct from the furnaces.

Stacks of the new furnaces are 92 feet high and 17 feet in diameter. They will each consume 500 tons of coke, 1100 tons of iron ore, 250 tons of limestone and 2,500,000 gallons of water every 24 hours. Each furnace will produce 50,000,000 cubic feet of gas which will be used to operate the entire plant, the remainder to be sold for commercial purposes.

The River Rouge plant is superintended by Frank Hadas, while the engineering features have been in charge of W. D. Mayo, chief engineer of the Ford organization.

The Dail Steel Products Co., Lansing Mich., has purchased 800,000 pounds of steel from the navy.

Dyemakers

Paying as High as 15 Cents for Naphthalene in Open Market

New York, May 24.—Dye manufacturers are going into the open market in increasing numbers for naphthalene, closing on spot supplies at 12 to 13 cents and in some instances as high as 15 cents. This applies to both flakes and balls; in fact, to most all descriptions of naphthalene. In the meantime, producers are quoting nominally at 10 to 11 cents, works, for flakes, and 9½ to 10½ cents for balls, and occasionally, in an isolated instance, they are able to supply a little spot material at these prices. But these cases are exceedingly rare.

Although producers are in the position to take a little spot business in toluol, they are unable to consider orders for either benzol or solvent naphtha. Some sellers assert it may be several weeks before production and deliveries become sufficiently normal to enable them to quote on current offerings. At present, output appears to be as bad as it has been at any time, not being more than 60 per cent of capacity and in some cases, less. The market, however, appears to be nominally unchanged, pure benzol holding at 30 to 33½ cents, works; 90 per cent at 28 to 33½ cents; toluol at 31 to 36½ cents, and solvent naphtha, 25 to 30½ cents.

Domestic buying of sulphate of ammonia continues in evidence, although on a considerably smaller scale. Spot trading has been made exceedingly difficult by the continued demoralization of traffic, and contract business is falling off, it being near the end of the season for the fertilizer interests. Foreign demand remains dull. Prices are unchanged.

Coke Oven By-Products

Spot

Per Gallon at Producers' Plants	
Pure benzol	$0.30 to 35½
Toluol	.31 to 36½
Solvent naphtha	.25 to .31½
Per Pound at Producers' Plants	
Phenol	nominal
Napthalene, flake	nominal
Naphthalene, balls	nominal
Per 100 Pounds at Producers' Plants	
Sulphate of ammonia	$4.50 to 4.60

Contract

Pure benzol	nominal
Toluol	nominal
Solvent naphtha	nominal
Per Pound at Producers' Plants	
Phenol	nominal
Naphthalene, flake	nominal
Naphthalene, balls	nominal
Per 100 Pounds at Producers' Plants	
Sulphate of ammonia	$4.50 to $4.60

Tool Builders Review Half Year

President Newton Reports Prosperous Conditions of Past Six Months and Expresses Confidence in the Future—Export Situation Analyzed and Condition Favoring the American Machinery Builders Are Pointed Out—Railroad Needs Presented

CONFIDENCE in future, trade conditions, was expressed at the semiannual meeting of the National Tool Builders association, held at Hotel Traymore, Atlantic City, May 20 and 21. The conscensus of opinion was that any business depression that might develop as the result of strained credit conditions would be short-lived. Export, finance, labor and transportation problems all were discussed and the need for continued co-operation in solving them was seen. It was emphasized that in the present railroad muddle, with lack of transportation acting as a brake upon industry, it was necessary to co-operate in every way with the carrying systems, both in prompt loading and unloading of cars and in utilizing every inch of space provided.

Again the need for accurate cost-keeping was brought before the approximate 200 members present and it was stated that in view of increased production costs, it would not be possible to reduce prices of machine tools.

In his opening address Thursday morning President Albert E. Newton reviewed briefly the half year elapsing since the organization's last meeting. He said that instead of an expected halfway depression, toolmakers had experienced an unusually easy selling market and generally had enjoyed a prosperous half year. He expressed the belief that if a business depression of any weight did come it would be of short duration; that a resumption of good business conditions would appear within a few months at the most and that while most of the toolbuilders today are experiencing a shortage of new orders, they have plenty of unfilled business on the books.

He said that government owned machine tools had not flooded the market, contrary to expectation, except insofar as they have been sold to educational institutions at low prices. In this connection he said:

An absorption of a large quantity of machine tools by these various schools is bound to benefit the entire country. The need for mechanical training is greater today than ever before and is bound to increase. I believe that a period of trade and technical school development is just commencing and that the importance and necessity of these institutions is becoming increasingly apparent because of our actual dependence upon machinery and mechanical devices for the maintenance of our present and any future betterment of our living conditions.

The price cutting wave now attracting attention throughout the country is caused by the calling in or refusal of loans and not by an over supply of materials. In many cases these retailers could not replace these stocks at the prices at which they are being sold. In the machine tool industry, I know we could not in the near future replace our inventories of finished and semifinished materials at anywhere near the cost of present inventories. I also know that during the last few months production costs have increased faster than have selling prices—hence machine tool prices can only remain at the present level at least.

Mr. Newton emphasized the importance of accurate cost-keeping and reviewed some of the work the association has accomplished in this connection. He intimated that its scope probably would be broadened.

Since the program scheduled but three papers, two of which were delivered, much opportunity was given for brief officers' reports, preliminary committee reports, discussion of problems facing industry and group conferences. Frank Bruce, the Bruce Publishing Co., Milwaukee, was unable to be present to deliver his address on "Machine Tools in Schools."

Carl Dietz, vice president of the Norton Co., Worcester, Mass., delivered an address on "European Conditions and Their Bearing on the Machine Tool Industry," Thursday afternoon. He recently returned from an extensive tour of England, France, Belgium, Italy, Holland and Germany, and outlined the situation in those various countries as regards machine tools. He said in part:

The impetus which the war has given to the machine tool industry will prompt many foreign machine tool builders to challenge the American product not only in their own countries but foreign markets, even to a greater extent than ever before in our own domestic market.

English makers will not be content to let American products have the sway of pre-war days, but will try to meet the demand of her growing mass production industries, especially the automobile development. Through its machine tool association English builders will invade systematically and in force, other markets worthy of development and capable of an adequate return.

There is in England at this time a very active demand for machine tools and British manufacturers are indeed hard pressed to meet it.

France and Belgium will with the gradual rebuilding of their industries continue to require machine tools, but a great deal must precede the placing of this equipment. They must first reconstruct their plants and then be sure of their raw material, coal for power, iron and steel to be worked with, also a more stable labor condition. Unless machine tools are not acquired for the immediate production of wealth creating objects it would be folly for Belgium and France to place orders with us at the present high prices and with the dollar at the premium it commands. For example, a tool that in 1914 cost $2000, equivalent roughly to 10,000 francs, today cost in America not less than $4000, and at the present exchange rate 60,000 Francs.

Italy is in the same relative position and any of these countries can, provided delivery may be secured, buy to better advantage in England so long as the dollar pound sterling exchange shows 25% depreciation.

Much has been said of the effect of German machine tools on the markets outside of Germany. There appears to be a popular delusion that Germany is going to promptly step in and bid for the machine tool demand of the world at what would be to us ruinous prices. Nothing can be farther from the truth.

For a considerable period last year the average monthly outgo for export of German machine tools amounted to about 50,000,000 marks. This sounds very large, but when it is considered that the prices at which such tools were sold range from 12 to 17 times pre-war prices, it could after all not have been a very large tonnage. Contrary to all that has been said of the Germans going back with renewed energy, a willingness to work for the sake of retrieving their economic losses, we did not learn of a single instance where such a spirit was even remotely indicated. On the contrary, demands of the workers have gone to almost preposterous lengths not so much from the standpoint of wage increase which considering the increased cost of living is at least justified and probably still somewhat too low, but because of their attitude toward production as a whole.

During the period of complete isolation due to the War, German manufacturers have made faithful copies of some of our well known American tools and are marketing them without regard for origin of design. They will in due course try to invade other markets with these

products, but after all we have not stood still and have gone far beyond the status of the machine tool trade of five or six years ago.

There is a leveling process going on — never again will we see the disparity between wages here and abroad — the world has grown smaller as it were and in the various manfacturing countries in due course the same general fundamental conditions will prevail. Price will not be nearly so important a factor in the future trade relations.

He was preceded by Roy V. Wright, editor Railway Mechanical Engineer, New York, whose address dealt with "The Relation of Machine Tools to the Transportation Problem." Mr. Wright said that at this time when the railroads figuratively were up a tree, what they needed more than anything else was the patience, forbearance and co-operation of all manufacturers in general in the prompt unloading and loading to capacity of cars and of the machine tool manufacturers in particular to the end that available funds may be expended to the best possible advantage and for the machines most needed in the respective shops.

Many shops in the country have a large number of tools which can best be described by the use of the words "ancient" or "antique." In general it is safe to say that but few roads are not in need of a considerable number of new tools, while many of the roads ought, in the interest of efficiency, to make heavy expenditures for machine tools and shop equipment. The *Railway Age* in an article in its Jan. 2, 1920, issue showed as a result of an extensive and careful study that to provide for the normal growth of the railroads and to bring the equipment into proper shape at least $54,000,000 should be expended for shop machinery and tools within the next three years.

One of the great difficulties in the way of getting approval for the purchase of new tools or equipment is that under any conditions, and particularly under the present financial conditions, the executive officers must have placed before them strong, convincing arguments as to the returns which will be made from the new investment.

With the high wages, scarcity of labor, great increase in the cost of rolling stock, and the extreme difficulty in getting new equipment the idle time of every car and locomotive must be cut to a minimum. The weakest spot in the railway mechanical department is its engine house or engine terminal facilities. Engine houses have been outgrown because of the rapid development in the number, size and capacity of locomotives.

A number of roads have found it profitable to establish central manufacturing plants to produce certain parts, wholly or partially finished, which could be shipped to the repair shops and engine houses. This development has created a demand for certain automatic, semiautomatic and production tools, and the indications are that the practice will be very considerably extended.

R. E. Flanders reported for the committee on standardization in the afternoon session on Thursday, while H. W. Dunbar presented his report on the national public works department, which has for its purpose the passage of legislation which will reduce government expenditures through a budget system for all government buildings and their equipment.

The committee on standardization will present a more complete report at the fall meeting but Mr. Flanders stated that it had been proposed to form a committee composed of makers, users, engineers and others who are interested in the standardization subject and that the National Machine Tool Builders' association for one had been invited to represent the commercial side of machine tool manufacture. This body would be similar to the British Engineering Standardizing committee which was formed to eliminate duplication of effort. He said it had been proposed to standardize small tools used on machine tools such as milling cutters, drills, etc., together with the parts on machine tools relating to or working in conjunction with those small tools and safety appliances on machines.

Another interesting report was made by the chairman of the committee on Chinese problems which reviewed not only the extent to which American manufacturers have contributed or sold at reduced prices machine tools to Chinese schools but also the work which had been done to get students from that country into American trade schools and the shop schools of American machine tool manufacturers with the purpose of educating China in American practice. It was stated that since China is just beginning to develop mechanically, the importance of such work cannot be overestimated.

Separate committees for each machine tool produced by the various members held individual meetings on Friday morning and Friday afternoon was devoted to an executive session.

Supplymen Air Reconstruction Problems

KEENLY alive to the necessity for caution and conservatism in meeting the problems of finances, transportation and labor, three mill supply associations ended the most successful three-day convention of their respective histories at Atlantic City on Wednesday of last week. The organizations which convened at the Marlborough-Blenheim hotel on May 17 are the American Supply and Machinery Manufacturers, National Supply and Machinery Dealers and the Southern Supply and Machinery Dealers associations. Between seven and eight hundred attended the convention including delegates and guests, and unusually well sustained interest in the sessions was marked right to the close of the convention.

One of the features of the convention was an address before the American body by Hon. Felix H. Levy on "Recent United States Supreme Court Decisions," as noted briefly in these columns last week. Mr. Levy explained at length that the Sherman law was aimed at wicked practices which affect the people of the country and never was meant to interfere with co-operative measures of trade associations. This inspired considerable discussion of the Sherman act at both of the gatherings referred to and on the part of the manufacturers resulted in the passage of a resolution favoring an amendment to that act which would legalize co-operative agreements among merchants, when supervised and controlled by the federal trade commission.

Another feature of the convention was an address to the manufacturers by Fayette R. Plumb on "Excess Profits Tax." Perhaps as a direct result of this address this body passed a resolution urging congress to reduce the present heavy tax burden, condemning recent proposals for additional retroactive taxation and recommending that the association and its individual members co-operate with the tax committee of the national industrial conference board in an endeavor to improve the federal taxation system.

With the transportation situation grasping at the very vitals of industry it was only natural that this subject should be uppermost in practically everybody's mind at the convention. Everywhere, both in and out of scheduled gatherings was this a topic of discussion. Many manufacturers are unable to ship completed products and in some cases such stocks are utilizing all available space so they cannot manufacture more, hence men are being laid off. In other cases, raw material stocks have all been used up and additional supplies cannot be obtained. Here too reduction of working forces is the result. Manufacturers are from two to eight months behind on orders and when able to get a shipment through,

Resolutions Adopted at the Executive Session

Of the American Supply and Manufacturers' Association Held Wednesday Morning

RESOLVED, that in the opinion of this association, the overwhelming sentiment of the country, representing both labor and capital, would strongly favor a suitable amendment of the Sherman law whereby its prohibitions against trusts and monopolies would not only be maintained but strengthened but whereby co-operative agreements among merchants, recognized as legal in all other countries but ours should be legalized with adequate provision for supervisory control by the federal trade commission to prevent abuse.

RESOLVED, that we, the American Supply & Machinery Manufacturers' association, in convention assembled, urge with all our power that congress use every means to reduce the heavy burden of taxation, and view with alarm the recent proposals of additional taxation. Most especially we must condemn any proposals for retroactive taxation as destructive of the productive power of the nation at the very period when it is most necessary that production should be increased as the most effective means of reducing the cost of living.

RESOLVED that this association as an organization and also through its members individually, should co-operate with the tax committee of the National Industrial Conference board in an endeavor to secure a better system of federal taxation through the united efforts of productive industry.

are only able to ship a small part of the dealers' requirements, hence dealers came with the big question: "When will goods be shipped?" The only answer possible according to the manufacturers is: "When the transportation situation improves." All are agreed that unless relief comes speedily, the problem will become more severe and none can tell how far-reaching it will be in its results.

W. O. Rutherford, vice president, B. F. Goodrich Rubber Co., Akron, O., in a brief address before the National association on Wednesday, emphasized the importance not so much of making sales, but the manner of making sales and making sales stick.

Brief talks by prominent manufacturers were given at Tuesday afternoon's session of the National organization. The following topics were discussed: Transmission, by M. W. Mix, president Dodge Mfg. Co., Mishawaka, Ind.; Chain hoists and allied products, by Charles W. Beaver, Yale & Towne Mfg. Co., New York; leather belting, by J. R. Fox, general sales manager, Graton & Knight Mfg. Co., Worcester, Mass.; tubular goods and steel products, by John J. Kennedy, general manager of sales, National Tube Co., Pittsburgh; steel pulleys, by William R. Simpson, secretary, American Pulley Co., Philadelphia; chain products, by W. M. Taussig, American Chain Co., Bridgeport, Conn.; and cap and set screws, by Harold G. North, Ferry Cap & Set Screw Co., Cleveland.

After a report on overhead expense figures and a report by H. W. Strong of Strong, Carlisle & Hammond Co., Cleveland, chairman of the committee on distribution which inspired a long drawn out discussion, the National association listened to several brief addresses on methods of securing efficiency and loyalty from employes. Included in the speakers were: C. J. Smith, Stambaugh-Thompson Co., Youngstown, O., and J. W. Wright, Colcord-Wright Machinery & Supply Co., St. Louis.

Informal remarks then were made by Ernest L. Davis, S. H. Davis Co., Boston, and Will R. Sostheim, George B. Carpenter & Co., Chicago, on future policies of distributors with reference to higher mark-ups in view of increased selling costs. W. M. Pattison, W. M. Pattison Supply Co., Cleveland, spoke briefly on the advantages of association membership. Interesting discussion was indulged in with reference to losses in twist drill distribution and manufacturers' cash discount.

Sessions of the Southern association were of importance to its members since so many problems peculiar to the South were discussed. Included in the topics which were brought before the sessions scattered through the three days were: Taxation, satisfactory bases for employing salesmen, syndicate buying, future credits, cash discounts, proper profits spread, high prices and effect of radical propaganda on business and government. A feature of Wednesday morning's session was the presentation of figures showing cost of doing business in 1919.

Three Associations Elect New Officers

American Supply and Machinery Manufacturers Association

NEW OFFICERS

President, Charles W. Beaver, Yale & Towne Mfg. Co., New York.

First vice president, Irving W. Lemaux, Indianapolis Brush & Brown Mfg. Co., Indianapolis.

Second vice president, J. C. Ruf, I. B. William & Sons, Dover, N. H.

Third vice president, Harold F. Seymour, Columbian Hardware Co., Cleveland.

Secretary-treasurer, F. D. Mitchell, 406 Woolworth building, New York.

NEW EXECUTIVE COMMITTEE

‡Chairman, J. G. Derrick, Pittsburgh Steel Co., Pittsburgh.

W. S. Paden, Machinery Co. of America, Big Rapids, Mich.

A. B. Peck, American Screw Co., Providence, R. I.

Louis S. Jones, Lumen Bearing Co., Buffalo.

*Frank A. Morrison, Mason Regulator Co., Boston.

*Re-elected.

†Member last year.

National Supply and Machinery Dealers' Association

NEW OFFICERS

President, Crannell Morgan, the Hardware & Supply Co., Akron, O.

First vice president, in charge of machinery, interests, J. N. Wright, Colcord Wright Machinery & Supply Co., St. Louis.

Second vice president, R. F. Blair, Pittsburgh Gage & Supply Co., Pittsburgh.

*Secretary-treasurer, Thomas A. Fernley, Philadelphia.

*Advisory secrtary-treasurer, T. James Fernley, Philadelphia.

NEW EXECUTIVE COMMITTEE

W. J. Redcliffe, E. A. Kinsey Co., Cincinnati.

H. E. Ellsworth, White Tool & Supply Co., Cleveland.

*Ernest L. Davis, S. H. Davis Co., Boston.

*C. C Coventry, Cleveland Tool & Supply Co., Cleveland.

*Re-elected.

Southern Supply and Machinery Dealers' Association

NEW OFFICERS

President, W. Marshall Turner, Turner Supply Co., Mobile, Ala.

First vice president, F. A. Heitmann, F. W. Heitmann & Co., Houston, Tex.

Second vice president, J. H. McKinnon, Cameron & Barkley Co., Jacksonville, Fla.

*Secretary-treasurer, Alvin M. Smith, Smith-Courtney Co., Richmond, Va.

NEW EXECUTIVE COMMITTEE

Chairman, W. P. Simpson, C. T. Patterson Co., Ltd., New Orleans.

E. L. Parker, Taylor-Parker Co., Norfolk, Va.

Fred W. Glober, Textile Mill Supply Co., Charlotte, N. C.

*T. G. Hyman, Hyman Supply Co., Newbor, N. C.

*Re-elected.

Celebrates Fortieth Anniversary

Cleveland Firm, Founded May 5, 1890, Observes Completion of Fortieth Year of Partnership and Twentieth as Corporation—Founders Achieve Notable Success in Manufacture of Machine Tools and in the Building of Precision and Astronomical Instruments.

ON MAY 19 at the offices and plant in Cleveland the founders, members, and employes of the Warner & Swasey Co. held appropriate ceremonies to celebrate the fortieth anniversary of the firm. Many friends and associates of Mr. Warner and Mr. Swasey attended an informal reception in the morning and congratulatory telegrams were received from professional and business men in the United States and abroad.

Following a luncheon at the Shaker Heights Country club, a meeting was held in the shops on Carnegie avenue. Addresses were made by Mr. Warner and Mr. Swasey and awards were made to men who had been in the employ of the company for more than 25 years.

A medal, which was struck off especially for this occasion by Victor Brenner, New York, is reproduced at the top of this page. For the purpose of recording the anniversary, the company distributed an attractive 60-page souvenir booklet containing a brief history of the partnership; biographies of the founders, and considerable information regarding the development of machine tools and the building of astronomical instruments. Frank A Scott, vice president, contributed an article outlining the present position of the company in trade and industry. The latter part of the book is devoted to brief personal sketches of members of the Warner & Swasey organization; the war record and honor roll of the company; and reproduction of various medals.

The early history of the Warner & Swasey Co. is particularly interesting. Strangely enough, the founders were born in New England in the same year. Worcester Reed Warner was born near Cummington, Mass., and was educated in the rural district schools. At the age of 20 he was employed at a machine shop in Exeter, N. H., where he met Ambrose Swasey, who had attended rural schools near Exeter. In 1870 the young men completed their apprenticeship and entered the employ of Pratt & Whitney at Hartford. Soon after Mr. Warner was given charge of one of the firm's largest departments and as foreman he greatly reduced the production time of several machine operations. He also took up astronomy, and while in Hartford built a mounting for a portable telescope. Mr. Swasey was in charge of the gear cutting department of the Pratt & Whitney firm and after studying the problems of gear cutting, he devised and constructed the epicycloidal milling machine. He also invented a gear cutting machine for generating and at the same time cutting the teeth of spur gears. On May 5, 1880, the two men moved to Chicago, where they established the firm of Warner & Swasey. Within a year the company went to Cleveland because of the scarcity of skilled mechanics in Chicago. In 1881, the first factory building was constructed on the site occupied by a portion of the present plant.

First Order was for Lathes

The first order was for 10 hand-lathes and other orders for different types of machines soon followed. During the early years machines for milling the cams of sewing machines were designed and constructed. Vertical milling machines for die sinking also were made in considerable quantity. Later a horizontal boring machine was added. The turret lathe was destined from the beginning to be the principal product of the firm.

However, the work was not confined to machine tools. In 1881 a 9½-inch equatorial telescope was designed and constructed by the partners, this venture having been made possible by the earnings of the early orders for machine tools. The success of this first telescope served to create added interest in that product and during the several years following, numerous contracts were taken for the construction of other instruments. Warner & Swasey constructed the 36-inch refracting telescope of the Lick observatory, Mount Hamilton, Cal.

One of the most important achievements was the construction of a dividing engine for automatic graduating circles of 40 inches or less in diameter requiring the greatest accuracy, such as are necessary for astronomical and other instruments. Severe tests show that the greatest errors of this engine are less than one second of arc.

In 1900 the business which for 20 years had been conducted as a partnership, was incorporated under the name of the Warner & Swasey Co.

One of the important factors in the development of the company has been the Warner & Swasey course in mechanical training. Nearly 40 years ago, Mr. Warner and Mr. Swasey began to train apprentices. The early apprenticeship course has been greatly extended to include every class of skilled machine shop work. In 1911 the company established in the factory under the direction of a technical instructor, an apprentice school for the purpose of augmenting the practical training by the study of drafting, mathematics, mechanics, materials, etc. Many important positions in the company are now held by graduate apprentices, including the works engineer, superintendent, assistant superintendent, production engineer, foreman of drafting room, employment manager,etc.

In 1909 Mr. Frank A. Scott became associated in the business as secretary and treasurer and in 1916, he was elected vice president. Other members of the company are: L. B. Stauffer, secretary; P. E. Bliss, treasurer; E. P. Burrell, works manager; A. C. Cook, general sales manager; L. K. Berry, domestic sales manager; C. J. Stilwell, foreign sales manager; G. A. Decker, works engineer; Adam Herkner, superintendent; P. J. Herkner, assistant superintendent; W. J. Burger, production engineer, and Stephen Lawson, foreman of designing.

Removing Tar from Coke Gas-I

Tar Drops or Bubbles Are Separated from By-Product Coke Oven Gas by Condensing, Washing, Friction or Concussion—Length of Main, Speed and Cooling Are Important Factors in Condensing Method

BY A. THAU

WITH the old indirect recovery by-product plants the separation of tar from the coke oven gas was a comparatively easy matter, inasmuch as very small traces, which from a commercial standpoint were hardly worth the trouble to recover by special effort, could be left in the gas. Even if these traces separated out afterwards, they deposited themselves in the scrubbers or in the burner pipes of the ovens, from where they could easily be removed as necessity arose without causing further inconvenience.

Since the introduction of the direct recovery plants, these conditions have changed. Now the separating of the tar from the gas requires the greatest attention and in many cases is the most difficult problem in these plants. Even small traces of tar in the gas, which on a plant of the old indirect working type could be disregarded, must be removed in a direct recovery plant; otherwise they are carried forward into the saturators and form a layer of tar floating on the top of the acid bath. By the heat of the bath the light oils are driven off and carried away with the gas, while the heavier, pitchy substances sink to the bottom and mix with the sulphate, forming smaller or larger pitch globules to which, if appearing in any quantity, sulphate buyers naturally object. If such a distillation of tar takes place in the saturators the heavier oils mix with the acid and give the sulphate a yellowish to dark brown color, the degree of discoloration depending upon the amount and the nature of the tar getting into the saturators. In order to obtain a sulphate of good salable quality it is of primary importance that the gas, before entering the saturators, should be entirely freed of tar.

Tar in its commercial form is a composition of carbon and hydrocarbons which by fractionate distillation can be separated afterwards. When in form of vapor leaving the oven retorts this composition is not a united product but hydrocarbons of different boiling points are given off at different times and when condensed and mixed they form the tar. The condition of the tar as contained in the coal gas may be best understood by assuming that it is carried in the form of very small drops and these drops are so minute that the agglomeration forms a fog, or a gas of its own which is present in intense mixture in the coal gas. If a number of small drops form a larger drop, it will be too heavy to be kept in suspension and to be carried along any great distance. Therefore it falls to the bottom of the pipe or apparatus, in which this formation took place.

The larger these drops are, the more easily and faster they fall, but it will

Outlines Status of Tar Extracting Methods

COMPARATIVELY little has been written regarding the problems encountered and methods employed in extracting tar from coke oven gas. In view of the present tendency to utilize by-product gas more extensively than heretofore, the subject of tar extraction is important.

In the accompanying article, the author, A. Thau, superintendent of coke and chemical plants, Oxelosund Iron Works, Oxelosund, Sweden, discusses the principles of tar extraction and explains the condensing method. In four supplementary installments, to appear in early issues of THE IRON TRADE REVIEW, *the author will describe in detail the removing of tar by the washing, friction and concussion methods.*

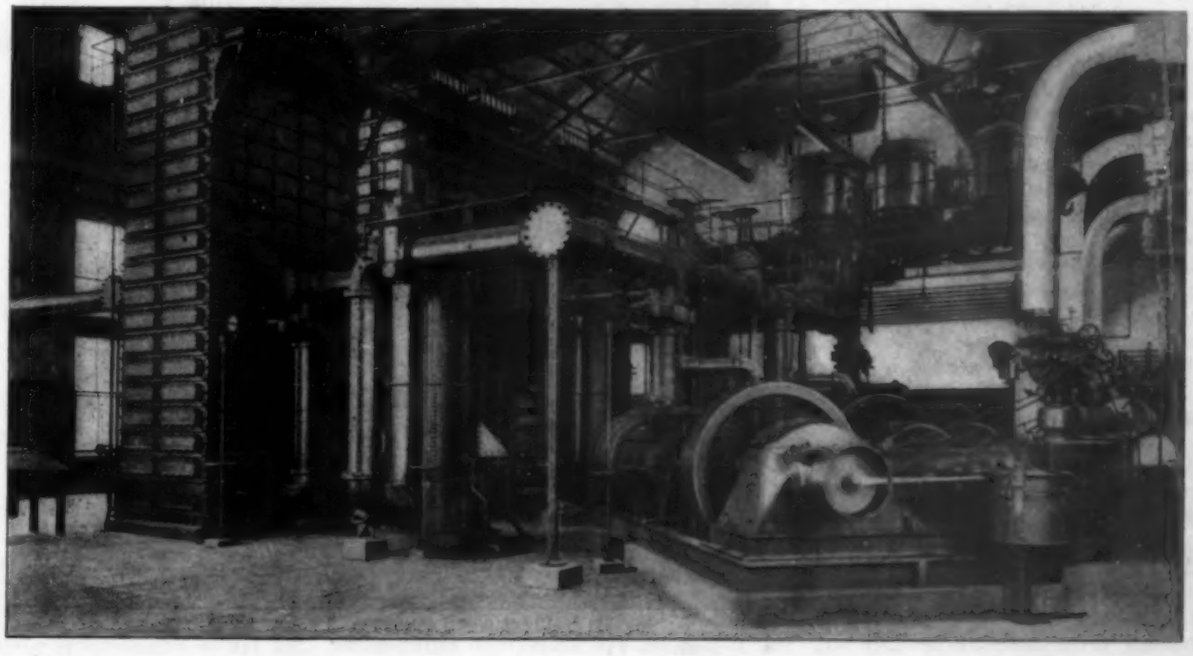


FIG. 1—GAS WASHERS, TAR EXTRACTORS AND EXHAUSTERS IN MODERN COKE OVEN PLANT IN THE UNITED STATES

FIG. 2—CENTRIFUGAL TAR WASHER USED IN CONTINENTAL EUROPE, SHOWING ARRANGEMENT OF REVOLVING DRUM

be understood that they cannot fall to the bottom if the velocity of the traveling gas surrounding them is greater than the velocity of the falling drops, in which case a separation is impossible. Should the velocity of the gas through a plant be greater than the speed of the falling tar drops, a separation of the tar would not take place. However, owing to the apparatus of large diameter through which the gas is conducted in every plant, this state of affairs is not possible.

Another Theory on Tar Fog

One can also accept the theory, frequently put forward without actual proof in or against its favor that the tar fog, when carried forward by the gas, consists to a large extent of a mass of minute bubbles filled with gas so that to get the tar to assume a liquid form the bubbles must be caused to burst and from drops which fall to the bottom. Regardless of which theory is favored, the ways and means to coagulate either minute drops or bubbles are exactly alike. The writer is inclined to believe that tar fog consists of bubbles as well as of drops depending upon the viscosity of the particular hydrocarbons but extensive microscopic tests which he carried out to ascertain the true state of tar fog, as the only means of getting at the real truth, did not throw any light on the matter.

To treat the gas in order to form tar drops of such dimensions that they will separate from the gas or, in other words, to extract the tar from the gas, the following methods are applicable and extensively used: Condensing, washing, friction and concussion.

Although these different methods in many and perhaps in most instances cannot be strictly separated, many forms of apparatus being constructed apply to two or three of the above methods at the same time, they are as near as possible classified and described under the respective heading.

To illustrate the constitution of a typical coke oven tar from English Durham coal, the following figures may be taken as a good average:

	Per cent
Water	2.23
Light oils to 170 degrees Cent.	1.84
Naphthalene	5.29
Creosote to 230 degrees Cent.	11.92
Tar acids	2.00
Heavy oil to 270 degrees Cent.	15.82
Anthracene above 270 degrees Cent.	2.42
Pitch	56.31
Working loss (by difference)	2.17
	100.00

In America, coke oven tar yields on an average:

	Per cent
Water	2.70
Light oil	1.40
Middle oil	3.50
Heavy oil	9.90
Anthracene oil	24.80
Pitch	56.40

The tar given off while coking varies almost continually and it will be understood that the different compounds condense at different temperatures. The process of condensing tar fog to liquid tar does not, however, proceed in quite this theoretical way. There are many

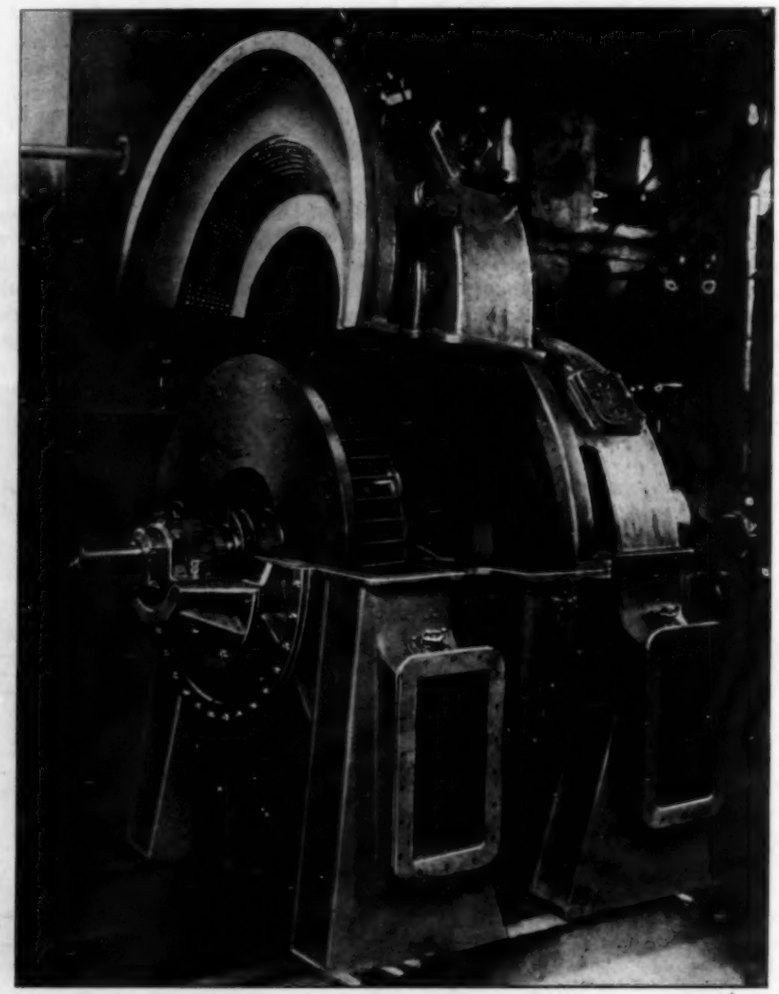


FIG. 3—COMBINED FAN WASHER AND DISINTEGRATOR. THE TAR IS INTRODUCED IN OPPOSITE DIRECTION TO THE GAS FLOW

other factors to consider of which the vapor tension of the different hydrocarbons is perhaps the most important; otherwise it would not be necessary to collect the tar at one spot of the plant and split it into its constituents by distillation afterwards. It simply means that by collecting the tar at various points of the plant, different products can be obtained, according to the temperature at which they are condensed at that spot. By such a rule it further follows that the tar condensed in the collecting main at a comparatively high temperature is a distinctly different product from the tar recovered further on in the recovery plant at, say, atmospheric temperature. There is, of course, a noticeable difference between these two kinds of tar, although their difference is not so pronounced as one would think. As yet, the extraction of tar by condensing lacks adequate scientific explanation, but we know that the contents of moisture in the gas have a serious impeding influence while the vapor tension of the tar varies also considerably in proportion to its composition. Steam carried along in the gas prevents the condensing of certain tar constituents, mainly light oils and naphthalene, and after applying the usual means of condensing a great deal of light tar is carried along in the form of fog and must be extracted by additional means which are described later.

The first condensing of the gas takes place in the collecting main and the major portion of the tar is separated out there. The temperature of the collecting main naturally has a great influence upon the amount of tar separated out. If the collecting main is arranged rather close to the oven tops and the ascension pipes are only a few feet high, the temperature in the collecting main is considerably higher as compared with a collecting main raised several yards above the oven tops. The ascension pipes in the latter case are considerably longer and the first condensing does not take place in the collecting main but in the ascension pipes. The heat, however, is still so great that the lighter compounds of the tar are distilled off again and a hard pitch is deposited inside the pipes which especially by the admission of air, eventually is further volatilized so that a carbon residue remains which is difficult to remove from the pipes because of the greater expansion coefficient of the iron surrounding the carbon scale. The collecting main is not as hot as that and the heavier parts of the tar stick easily to the bottom in the form of soft pitch In the case of a low arranged collecting main the temperature is considerably higher and in many cases so high that even the pitchy constituents of the tar cannot settle, but run along in liquid state and stick to the bottom of the gas conducting main where the temperature gradually decreases. Indirectly this is an advantage inasmuch as such a hot collecting main is easily kept clean from pitch, but owing to the permanent distilling process which goes on, a great amount of soft pitch is formed and lost as salable tar. The tar itself is thereby lighter in specific gravity and not quite so easily separated from water.

While the vapors mixed with the gas condense in the conducting mains, a certain amount of friction is created on the inner surfaces of the pipes, facilitating a formation of tar drops, not only by the friction itself but by the fact that owing to this friction the velocity of the gas is low near the periphery of the pipes and increases gradually toward the center. Thus the condensing is more intense on the gas farthest from the center and decreases toward the middle of the pipes. It is possible to have gas passing through a comparatively cool pipe, carrying a great amount of vaporized tar in the center while the gas near the wall is comparatively free of tar.

In the matter of freeing the gas from tar, a long gas conducting main is considered the best condenser. It can be kept clean easily and any naphthalene which may be liberated is kept in solution with the liquid tar and its depositing prevented. The Otto Coke Oven Co., before adopting the direct recovery process, used to increase the length of the conducting main by erecting several parallel lengths at different levels and connecting their ends to-

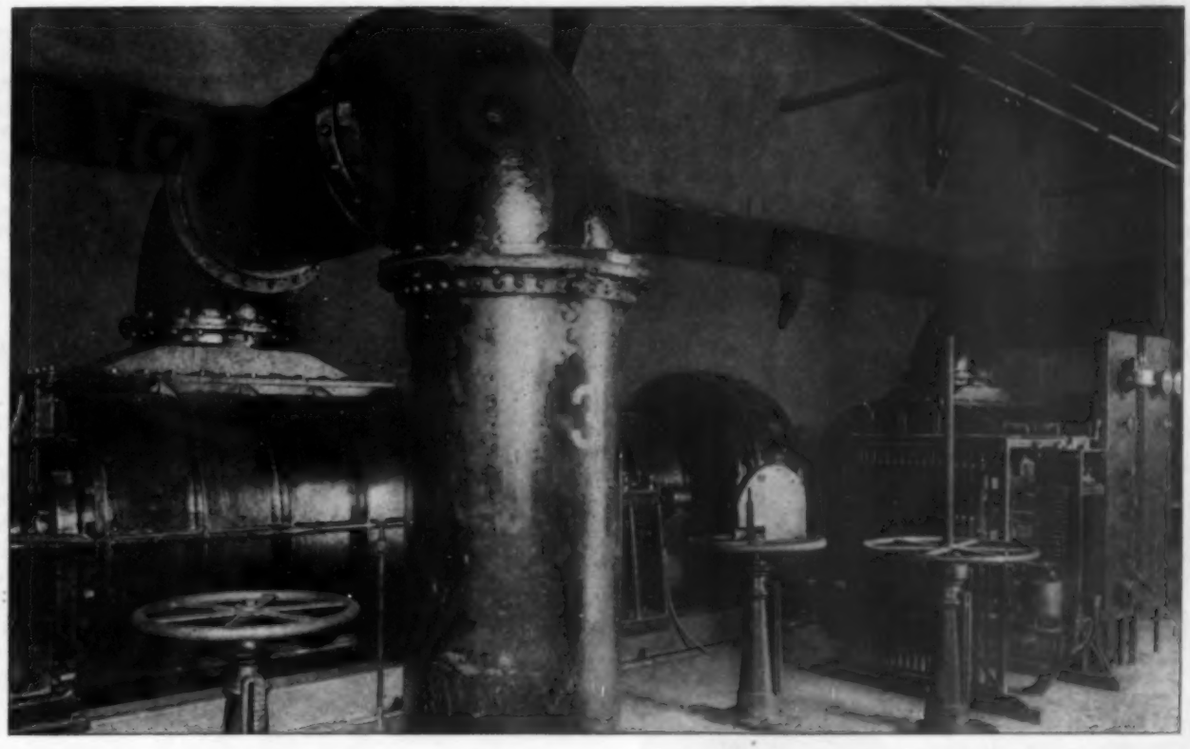


FIG. 4—GAS EXHAUSTERS IN THE BY-PRODUCT ROOM OF A LARGE PLANT IN THE UNITED STATES—THE EXHAUSTERS ARE DRIVEN BY 250-HORSEPOWER MOTORS

gether by double bends, thus forming the so called serpentine coolers. These were arranged at such a height that they could be flushed and cleaned in the same way as the conducting main by introducing pitch scrapers through cleaning holes.

Speed of Condensing Important

Too rapid a condensing must not be applied when condensing the gas as it facilitates an early dissociation of tar and naphthalene while there is also a danger of condensing benzol vapors which would be lost and go into the tar. By cooling the gas too rapidly, the bulk of the tar vapor is condensed and converted into liquid, but the naphthalene is condensed at a later stage and then not sufficient liquid tar is available to keep this naphthalene in solution. The naphthalene which otherwise increases the bulk of the salable tar, is then not only lost as such, but it obstructs the mains or the apparatus in which it deposits and requires a frequent removal by the application of steam and consequent interruption of the regular working.

The proper arrangement of the cooling apparatus is of great importance for the regular and effective working of the coke oven plant. It is not the intention of the writer to deal with the different constructions of the condensers in detail. In very old plants with large cylindrical or tubular apparatus, the so-called air condensers received the gas from the conduct main. They sometimes had tubes inserted from end to end through which the atmosphere circulated or a spray of water kept the tubes cool and effected a very gentle cooling of the gas. Some coke oven builders used to provide such air condensers with large openings at the bottom surrounded by a tar seal so as to facilitate the removal of soft pitch which was deposited in the bottom of the condenser. Other types of air condensers are so designed that the gas passes through a large number of cast iron pipes of comparatively small diameter, slightly inclined and arranged in vertical rows in zigzag way, which can also be sprayed with water from outside. These coolers, although somewhat expensive owing to their weight, are very effective condensers and remove a great amount of tar and naphthalene from the gas, especially if the temperature is kept high enough so as to prevent a separate liberation and depositing of napthalene.

Air coolers however, have been practically abandoned in designing modern plants and the water coolers with vertical or horizontal tubes through which water circulates are practically the only condensers now in use. To prevent too rapid a cooling of the gas, the water coolers are placed in series and the water circulates in such a way through the coolers that the hottest water meets the entering gas and the incoming water the gas leaving the coolers. In another form of condenser a water spray is arranged in the gas room to increase the condensing effect and to help in the formation of tar drops.

(To be continued)

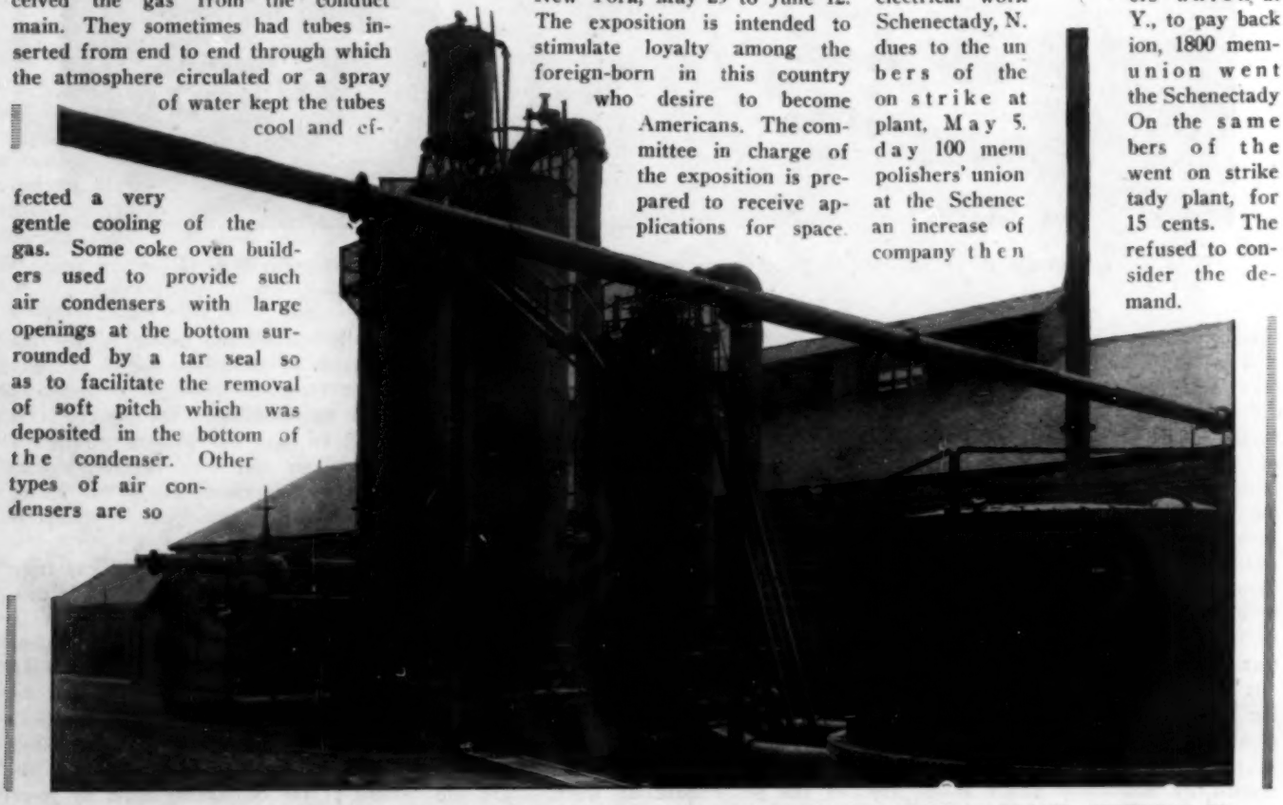


FIG. 5—FINAL COOLER, BENZOL SCRUBBERS AND GAS HOLDER AT A LARGE BY-PRODUCT COKE PLANT IN ENGLAND—UTILIZATION OF BY-PRODUCT OVEN GAS IS BEING EXTENDED IN MANY PLANTS

The Americanization Educational Exposition, Inc., which now has headquarters at the Hotel Commodore, New York, has announced its plans for the Americanization exposition to be held at the Grand Central Palace, New York, May 29 to June 12. The exposition is intended to stimulate loyalty among the foreign-born in this country who desire to become Americans. The committee in charge of the exposition is prepared to receive applications for space.

Because of the refusal of the General Electric Co. to force four former members of the local electrical workers' union at Schenectady, N. Y., to pay back dues to the union, 1800 members of the union went on strike at the Schenectady plant, May 5. On the same day 100 members of the polishers' union went on strike at the Schenectady plant, for an increase of 15 cents. The company then refused to consider the demand.

Residence Construction Is Forging Ahead

Figures compiled by the F. W. Dodge Co., New York, for the month of April show that after lagging behind for some months, building of residences has again taken the lead over all other classes of construction in the building industry. During the month total contracts awarded in the territory north of the Ohio and east of the Missouri rivers, amounted to $334,007,000, a slight increase over the March figure which was $327,897,000. Of the total amount, $103,743,000 or 31 per cent was for residential building; $65,498,000 or 20 per cent for public works; $62,181,000 or 19 per cent for industrial buildings and $57,115,000 or 15 per cent was for business structures.

During the month contemplated work was reported amounting to $445,053,000, bringing the total for contemplated work for the first four months of the year to $2,144,637,000, divided as follows: Residential buildings, $482,344,000; industrial structures, $432,523,000; public works and utilities, $423,317,000 and business buildings, $301,693,000. Total contracts awarded during the first four months of the year now amount to $1,114,415,000, as compared with $464,407,000 for the first four months of

Heat Treating Steel Uniformly

Qualities of Finished Product Frequently Vary in Spite of Uniform Furnace Temperature —Time for Saturation, Area of Surface Exposed and Mass of the Piece Are Important Considerations

BY C. D. BARNHART

IT IS generally assumed that the proper heat treatment of large quantities of steel of similar size and shape requires nothing more than a uniformly heated product; that a uniformly heated product requires nothing more than a uniformly heated furnace; that a uniform pyrometer record indicates a uniformly heated furnace and, therefore, a uniformly heated product within that furnace. Nevertheless, variations in metallurgical quality of the finished product frequently occur even with an indicated uniform temperature in the furnace chamber.

There is a great deal more in the problem than the maintenance of a uniform temperature in the heating chamber. It may be expected that there would be a material variation in the uniformity of heated product from furnaces of different types, but, as a matter of fact, wide variations quite frequently occur in material heated in the same type of furnace, the pyrometer readings in each case being the same. Such variations are generally brought about by a difference in method of placing material in the chamber and of applying heat to the material so placed. The final test is the uniformity of the heated product, which is determined by the manner in which the individual piece is cooled. The cooling is of great importance, although as a rule little attention is paid to this portion of the process.

While uniform heating is one of the main factors in the heat treatment of metals, it is the uniformity of the final set or adjustment of the structure in cooling that determines the uniformity of the actual heat treatment.

To heat the charge uniformly it is necessary that each piece be subjected to the heat in the same manner, at the same temperature, and for the same length of time. This requires something more than a furnace which will maintain a uniform temperature, without reference to the manner in which the heat at that temperature is applied to the material in the furnace.

If a large quantity of material is piled in a chamber, it is very likely that the outside pieces will be heated to, and cooled from, a higher temperature than the pieces at the center or at the bottom of the mass. If a large quantity of uniformly heated pieces is plunged into a quenching bath at one time, there is a tendency for the bath to become irregularly heated and for the pieces at the outside of the mass to cool at a different temperature and in a different period of time than those in the center.

With such mass methods of heating and cooling it is unreasonable to suppose that each piece receives the same amount of heat or is subjected to the same heat treatment. Notwithstanding the temperature indication, unless all pieces are heated and cooled exactly alike, the indication of uniform temperature, either in the heating or cooling zone, serves merely as evidence but cannot be accepted as proof of a uniformly heated chamber, a uniformly heat-treated product within that chamber, or a uniformly heat-treated product as the final result. There should be a better appreciation of the difference between a pyrometer record indicating an apparent uniformity of temperature in a chamber and of the factors that determine the uniform heating of a piece to that indicated temperature.

Possibilities in Heat Treating

A piece of fairly low grade steel, by proper and careful heat treatment, may be made to meet physical requirements that a higher grade steel, improperly or carelessly heat treated, would not meet. Of course, no heat treatment, however good, will ever make the low grade steel as good as the high grade steel can be made.

Dr. Howe, in his book *Iron, Steel and Other Alloys,* states: "You cannot make a bad beefsteak good by the cooking; you can cook it better or worse, and it will be a worse or a less bad beefsteak, but always bad. On the other hand you can easily spoil a good beefsteak by bad cooking. Now, just as cooking is to food so is heat treatment to steel. Indeed, a pedantic cook might reasonably call cooking heat treatment."

Dr. Howe's homely simile is very apt and to the point, and it would seem in order to draw a few comparisons between the stove that cooks the steak and the average furnace that heats the steel. The housewife, unsconsciously perhaps, shows an appreciation of the fundamentals of good heating when she uses a slow fire in baking bread or in cooking a pudding, of which the center has to be thoroughly done. She cooks a 10-pound roast much longer than a 3-pound roast. She realizes that if she fills her oven completely with food, it will prevent the proper circulation of heat. She does not take it for granted just because the thermometer on the oven door registers a given degree of heat, that her bread or pudding is well done. She makes certain that these are so placed in the oven that the indicated heat is applied uniformly to the bread or pudding.

While the application of heat in a furnace is better than in a cook stove, it is questionable whether the average heat-treater manipulates his dampers as intelligently as the housewife does, or employs the same effort and skill to get a properly heat-treated product.

Many furnaces now in use are not provided with the dampers so essential for controlling the air entering and the gases leaving the furnace. Even when furnaces are equipped with dampers, the dampers are frequently pulled wide open and left so, or sometimes entirely closed, the spent gases being permitted to escape from the heating chamber as best they can, often completely destroying the effect of good heat distribution within the chamber.

Consideration of uniformly heat-treated product involves four factors which govern the heating and cooling of all material, whether it be a loaf of bread or an ingot of steel: Temperature, time, surface and mass. The factors may be defined as temperature; the degree of heat required in the product to produce a given molecular formation and grain structure, and is more generally appreciated than the other three factors involved: Time, the period required to saturate the individual piece to the required temperature and to permit the required metallurgical reaction or diffusion and equalization.

Surface, the area of the individual piece exposed to the heat—which influences the rate of heat absorption, the time of saturation and the degree of uniformity throughout the piece.

Mass, the unit body to be heated—which influences the time required for

From a bulletin published and copyrighted 1919 by the W. S. Rockwell Co., New York. Rearranged from a paper presented at the recent Chicago meeting of the American Steel Treaters' society by C. D. Barnhart, who is associated with the Rockwell company.

saturation, the rate of absorption and the manner of exposure to the heat. Mass should be considered with reference to the individual piece and with reference to a mass composed of a number of individual pieces.

Temperature and time are the two basic factors. The temperature is determined by the metallurgical requirements. The time period is based primarily on the factors of surface and mass, which may be laid down as a rule to govern the heating or cooling operations. Due regard must be paid to the nature of the material itself. For instance, the time required for the proper saturation of a low carbon steel might vary from the time required for a high-grade alloy steel of identical surface and mass. Generally, in annealing, the time allowed for heating or cooling is too short, particularly with large pieces. From the heating standpoint this statement also holds good in some cases where there are large surfaces in proportion to mass, as in the heating of large circular saws for hardening.

Should Expose Much Surface

It is desirable to expose to the heat as much of the surface of the individual piece as possible. This holds good whether the operation is one of heating a single piece as a mass or of heating a quantity of individual pieces as a mass. This done, the only other element seriously affecting time is the mass, whether it is the mass of the individual piece or the mass of a quantity of pieces. When heating or cooling a quantity of individual pieces at the same time, it is desirable to avoid the large mass effect in order that there shall be no material variation in the surface area of each individual piece exposed to the heating or cooling atmosphere. In such cases it is desirable to break up the mass in a manner to reduce the depth of material and increase the surface of the material exposed to the heat. This generally reduces the time required and results in more nearly exposing each piece to the same temperature for the same time, instead of subjecting the outside of a dense mass to the heat for a longer time than the pieces at the bottom of the mass.

The ideal cooling condition is approached when these same factors are considered after heating. An illustration of this, from the standpoint of heating, would be to consider the difference in uniformity of a product in the form of small balls or bolts piled in a large mass on the hearth of a stationary furnace, or when passed through an automatic furnace in the form of a thin stream or layer. In cooling there would be a pronounced difference in uniformity resulting from plunging such a mass of heated material into a noncirculating bath and dropping a few pieces at a time into a circulating bath.

The construction and operation of the automobile radiator illustrates the relationship of mass and surface to time and of time to temperature. In the radiator it is necessary to break up the mass and to increase the surface in order to decrease the time of cooling. The same laws control the heating and cooling of steel.

In heating large dies it is desirable that they be thoroughly saturated at a temperature slightly below the final temperature before the formed corners or edges on the face reach the final temperature. As the life of a die is no greater than the life of the corners or edges, it naturally follows that every possible effort should be made to prevent overheating the corners or exposing them to the final temperature any longer than is absolutely necessary. The corners of the piece are the first to heat up and the first to cool off, and it is at these same sections that the evil effects of unequal contraction are manifested. These corners heat and cool more rapidly because the surface in proportion to the mass of these sections is much greater than that of the body of the die, which naturally reflects a difference in time of heating or cooling. With such dies it is most essential to consider the difference in time required to reach a given temperature in heating or cooling, due to the difference in surface and mass of the various sections of the die. Improper heating and cooling, resulting from a disregard of these factors, are responsible for a great deal of the limited service and loss of production, material and labor. Such loss greatly offsets any saving in time or fuel resulting from an attempt to heat the piece quickly without due regard to all the factors involved.

Principles Apply Regardless of Size

The difference between a small piece and a large one is mainly one of degree, insofar as these points are concerned. The principles hold good in either case. When a quantity of small pieces is heated indifferently, those on the outside of the charge are likely to be affected as the corners of the die, and while, in one case, it is only those outside pieces that are spoiled, in the case of the die the entire piece is ruined. The heat treatment of a small piece involves no large amount of money and the difference in cost beween proper and improper methods is surprisingly slight. The difference in results is all out of proportion to the cost, and it is only good business to bear the slight extra cost in order to produce a superior product, which is cheapest in the long run. In many cases a piece may be properly heat treated by a suitable method much more cheaply than by an inferior method.

The usual lack of consideration of these points of identical area and time of exposure for saturation accounts for the variations that so often occur in the finished product without any apparent change in the indicated temperature. Notwithstanding how elaborate the pyrometer or temperature recording system may be, good results cannot be secured unless the factors of mass and surface are considered along with the temperature and the time.

Manner of Exposure Important

The practice of charging and discharging material to or from a furnace without regard to these factors, but with an eye only to the pyrometer, seems to be more of a job of manufacturing pyrometer records than of producing a uniformly heated product. The manner of exposing a piece to the heat is just as important as the manner of indicating the temperature of the heat to which it is exposed. The pyrometer does not necessarily indicate the temperature of the material but merely the temperature of that part of the chamber in which the couple is located. Like the gage on the steam line, it indicates the existence of heat energy but it does not necessarily indicate the use made of that energy.

The indicated temperature must be considered with the element of time and with the influence that the factors of mass and surface have upon the time. The only test worth while to determine these points is the degree of structural uniformity disclosed by the microscope. A laboratory determination of temperature, with a surface exposure or mass effect different from that likely to obtain in the shop, is frequently responsible for material variations in quality disclosed by physical tests, in spite of evidence in the form of pyrometer records to show they should not exist.

Proper consideration must be given to the importance of the human element and the necessity for educating those in charge of heating operations to the fact that the heating of metals is an art or trade and that the man in charge of the operation is a sort of metallurgical chef, upon whose skill and judgment depend many subsequent operations and considerable money.

It is apparent that there is a waste of effort incident to the average heating test, which generally involves nothing more than an investigation of fuel consumption or temperature variation, without regard to the other important points involved in the process of producing properly heated material. Such tests are useless in determining the value of a furnace from the standpoint of heating material. The process of

converting the energy in fuel to heat in a furnace is substantially the same as that employed in the operation of an automobile engine. If the average furnace were designed and operated as intelligently as the automobile, there would be much less ground for complaint in reference to waste of time and fuel and misdirected effort. With the automobile, fuel is considered but one factor in the transportation results sought for, and it should be considered in the same light with furnaces for the production of results in the form of heated product. It is the results in transportation that test the automobile, and it should be the results in uniformly heated product that test the furnace.

The trade needs a better appreciation of these points and of the fact that the real goal is the production of quality product at the lowest cost, and that it is invariably cheaper in the long run to do it right than in the haphazard fashions prevalent at this time. An encouraging feature of the matter is that while heat treatment should be considered as an art or trade, the principles involved are not complicated or mysterious but subject to appreciation on a common-sense basis of reasoning. If the heat-treating public can be led to an intelligent consideration of these principles, there will be an improvement in methods as well as in quality and cost of operations. Consideration of the highly technical side is a matter to be dealt with by the skilled metallurgists, but after they have determined the method of producing a result there should be good judgment employed in producing that result on a large scale.

Tool Exporters Should Study Credits

RECOGNITION by American manufacturers and exporters of machinery, of the necessity for a comprehensive study of French and Belgian credit systems, is stressed in a recent commercial report by Trade Commissioner Charles P. Wood. He points out that heavy industrial machinery involves large monetary considerations and states that a mutually satisfactory basis for credit must be reached if contracts of any magnitude are to be consummated in those countries. Any existing basis must be fully understood and possibly translated into terms that can be understood in the United States as well as it is understood in Europe.

Low Exchange Lowers Sales

For several weeks past, the matter of exchange rates has militated somewhat against machinery sales abroad, although February's total was slightly in advance of January's and a gradual improvement seems to be in course of progress. It is against such improvement that Mr. Wood recommends that thorough attention be paid to the matter of credits. He continues:

It has been found that the American money rates are higher than Europeans are accustomed to pay. In connection with the basis for credit, the security offered by the buyer may be the deciding factor. Americans considering the extension of credit would naturally suggest that a mortgage on property owned by the industry would be required as security. Definite cases are known, however, in France and Belgium, where this method has caused a misunderstanding and has prevented further negotiations. Just what makes the European customer averse to the terms that are considered regular in America might well be determined before soliciting the business, so that the requirements for credit could be explained in terms that would not cause a misunderstanding. It is not to be thought that any reliable customer asking for credit would object to giving reasonable security, but it is undoubtedly true that the idea of giving a mortgage must be understood as Americans mean it to be understood, or some acceptable substitute must be worked out.

Allowance must be made by Americans for the reticence of the foreign buyer when asking for credit. It would seem that under such circumstances, the buyer would emphasize his principal assets and what he could offer as a basis for credit. This has not proved to be the case, and it has been left to the seller to find a basis for credit which the buyer has, apparently, not cared to mention.

An American banker, Dwight Morrow, is quoted as follows on this subject:

> The American manufacturer who is selling his products abroad might take the promise of his customer to pay for these articles at some future date, instead of demanding cash. Why does he not do it? For the simple reason that he, like every other member of the community, has available for investment only his profits or savings. After he has invested his own savings in a foreign credit he must look about for some other person who has savings and get that person to buy from his foreign customer's promises to pay. If he cannot find such a person he must quit selling to foreigners. * * * If credit is a thing to be extended to creditable people, then credit will be extended to the stable nations of Europe.

The report of the American industrial commission, 1916, includes the following regarding credits:

> Credit can be given with more safety in France than in most other countries. Failure to pay a debt is deemed a disgrace, which the whole family will try to prevent. Failures are rare. * * *
>
> French manufacturers and railroad men have high business standards, and they are concientious in meeting their obligations. They expect the same treatment from others, and, when it is given, a sure foundation of business friendship will be laid.

Opportunity Exists for Barter

The problem of re-establishing normal exchange is primarily one of re-establishing those essential producing industries which will provide products now being brought in from outside at the same time that they will provide other products in demand as exports from France and Belgium.

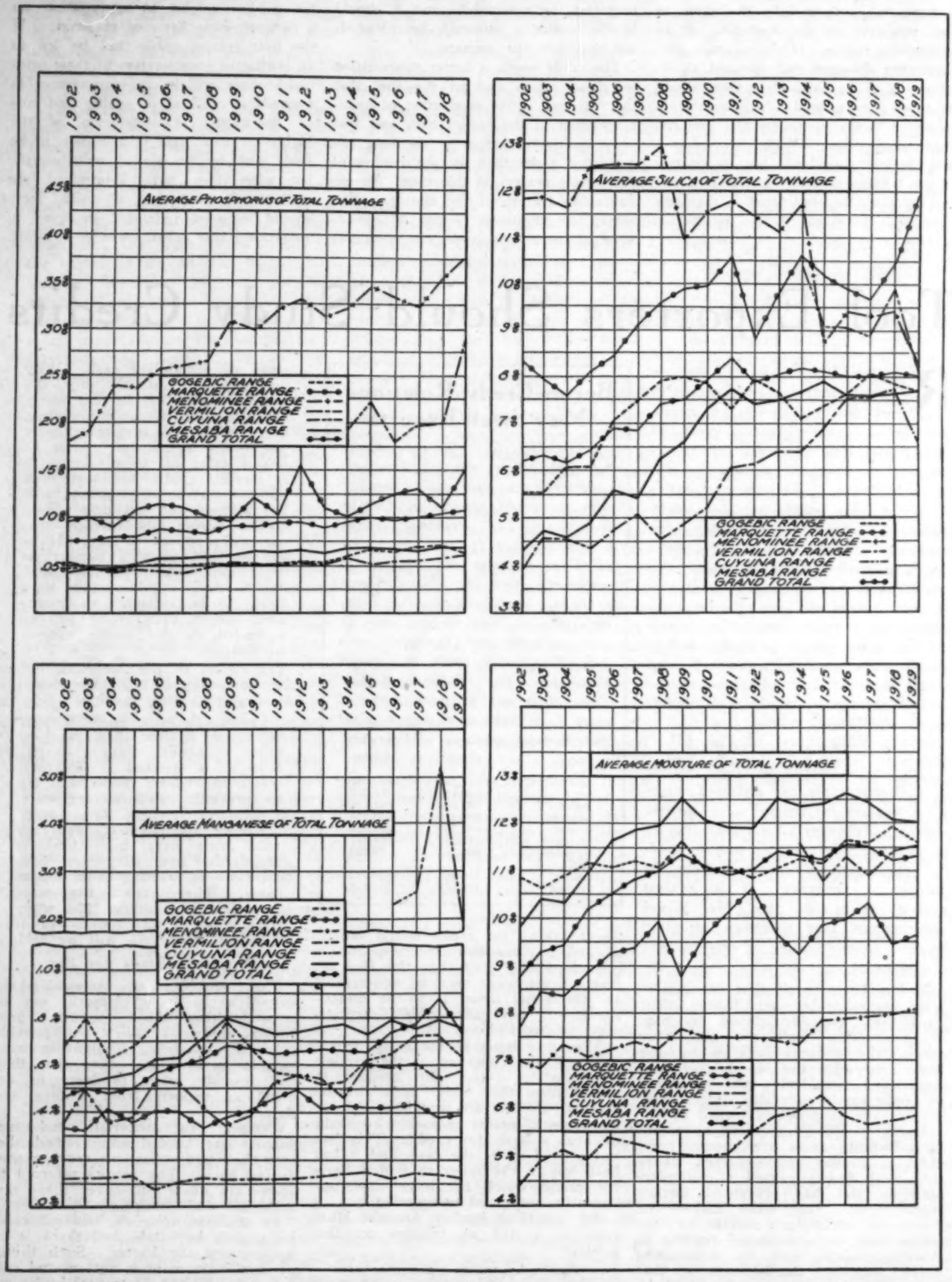
Certain raw materials and machinery are needed from outside before these industries can reach a producing basis. The credits referred to above are needed to cover these raw materials and machinery.

In addition to such business credits as can be established there is an opportunity for barter. Such things as machinery, copper, cotton, and coal from the United States might be exchanged for potash, olive oil, silk, linen, fine cotton textiles, and articles of art and luxury.

Better Credit Relations May Swell Exports

ACCORDING to the accompanying article, not all American exporters are sufficiently familiar with the credit systems of foreign countries. The exchange situation and other factors have combined to decrease the exports of machinery from the United States to France and Belgium, and if the exporters in this country are to gain a permanent foothold overseas, they must study the credit situation. The following table shows that exports have dwindled since June, 1919, and that a slight improvement appeared in February:

	France	Belgium
1919—		
June	$2,021,182	$993,045
July	1,130,486	558,038
August	785,558	242,701
September	1,095,418	358,256
October	2,066,792	266,684
November	1,415,195	214,417
December	963,773	76,721
1920—		
January	718,127	149,913
February	1,105,955	156,785



AVERAGE PERCENTAGE OF PHOSPHORUS, SILICA, MANGANESE AND MOISTURE IN SHIPMENTS OF ORE FROM LAKE SUPERIOR RANGES FOR EACH YEAR FROM 1902 UP TO AND INCLUDING 1919

Quality of Ore Holds Up Well

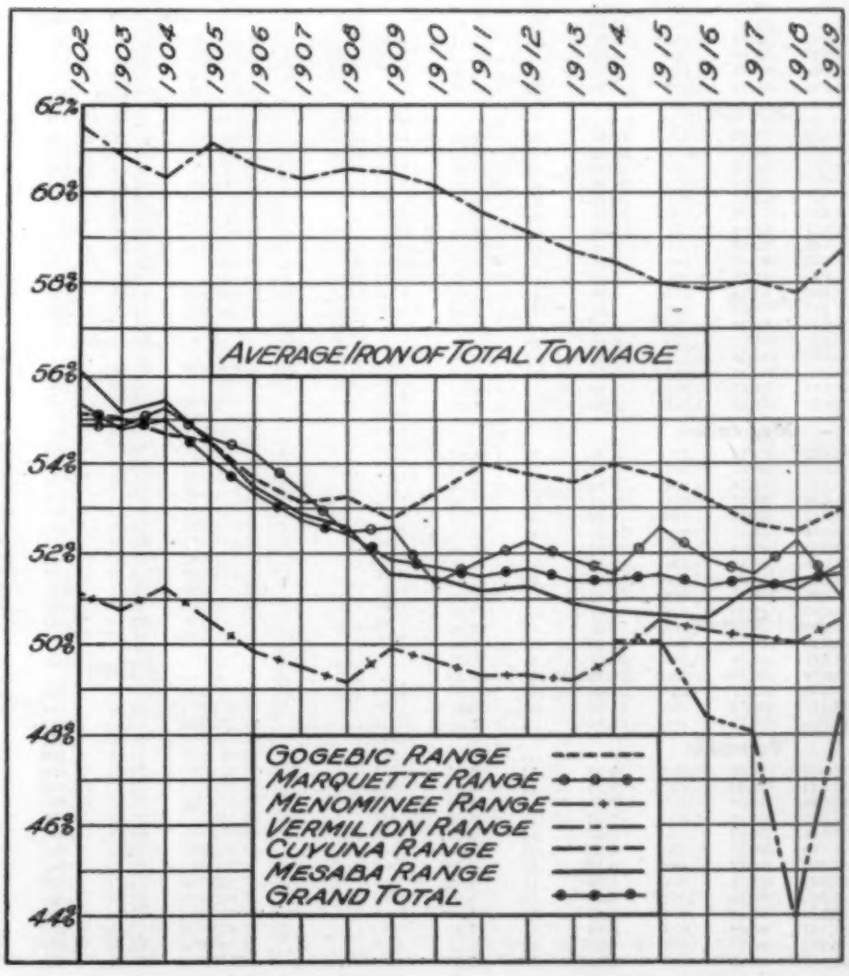
Average Yearly Decrease in Iron Content of Shipments from Gogebic, Marquette, Vermillion and Mesabi Ranges in 10-Year Period Was Only 0.05 Per Cent —Menominee Ores Show Increase of 0.052 Per Cent

AVERAGE analyses of total tonnages of iron ore produced in the Lake Superior district in the past 18 years show that the quality of the ores is holding up remarkably well. Despite much that has been said and written in recent years tending to indicate a rapid depletion of the supply of high grade ores, the analyses prove that there has been but a slight decrease in the average in the percentage of metallic iron. All other elements and factors considered, there is comparatively little deviation in quality; and if the average holds up as well during the next decade as it has in the one just past the average percentage of iron of all grades of ore in 1930 will be about 51 per cent, which is not appreciably lower than the present average. The tables of ore shipments just compiled for the Lake Superior Iron Ore association show that in 1902 the average content of iron in the ores from the Mesabi range was 55.39 per cent, and in 1919, 51.57 per cent. The average amount of phosphorus in 1902 was 0.075 per cent, and in 1919, 0.108. The average amount of silica in 1902 was 6.23 per ceint, and in 1919, 8.04, while the average amount of manganese increased from 0.46 per cent to 0.73. The amount of moisture increased from 8.71 to 11.34 per cent. Similarly, the Old range ores show comparatively little deviation. In 1902 the average content of iron was 54.71 per cent, and in 1919, 51.73; the amount of phosphorus increased from 0.104 per cent to 0.191; silica, 8.06 to 8.62; manganese, 0.40 to 0.70, and moisture, 7.73 to 9.96 per cent.

The average yearly decrease in the average iron content of all the ores from 1909 to 1919 was as follows: Gogebic range, 0.03 per cent; Marquette, 0.162 per cent; Vermillion, 0.189 per cent; Mesabi, 0.009 per cent, or 0.05 per cent for the total of all the foregoing ranges. Menominee range ores, however, show an average annual increase of metallic iron of 0.052 per cent. The latter increase undoubtedly was due in large part to the drop in tonnage of silicious ores.

The analyses show a comparatively rapid decline in the percentage of metallic iron in the ores from 1902 to 1908, and then a very slow decrease. For instance, the iron in the shipments of Mesabi range ores fell from 55.39 per cent in 1902 to 52.58 per cent in 1908, while since then it has varied only fractionally: It is difficult to determine what caused this, but it is reasonable to assume that careful grading and mixing of ores, with constantly increasing tonnage, was the chief factor. The increasing tonnage of concentrates produced by the washing plants of the Mesabi range undoubtedly had some effect on the average for this range.

The Vermillion range shipments show a very uniform decrease in iron from 61.6 per cent in 1902 to 57.9 per cent in 1918, but increased to 58.6 per cent in 1919, while the Menominee ores after showing about the average decrease from 1902 to 1908 remained contant until 1913 and have increased somewhat since that time. Shipments from all ranges, with the exception of the Marquette, show a very marked increase in the average iron content for 1919. The limits of the various groups or classifications into which the ores are divided are of necessity arbitrary, but represent as nearly as possible the requirements of the market according to the purpose for which the pig iron is to be used or the method to be employed for converting it into steel. It will be noted that while the percentage of bessemer ore decreased very rapidly from 1902 to 1915 and has remained fairly constant since that time, the total shows only little



AVERAGE PERCENTAGE OF IRON IN LAKE SUPERIOR ORES, 1902-1919

tendency to increase or decrease. This does not necessarily mean that there has been no increase in the tonnage of bessemer ore produced, but may be due in part to the tendency to mix high grade ore with that of lower grade, in order to increase the amount of merchantable ore, and to supply the ever increasing demand for low phosphorus nonbessemer ores, the bulk of the pig iron used in open-hearth furnaces being made from ores of this class.

It is probable, however, that this situation is due principally to the fact that there has been almost no increase in the producing capacity of bessemer steelworks during the period named, and, therefore, no increase in the demand for bessemer ore. Practically all increases in steel producing capacity have been in open-hearth furnaces.

The Gogebic range holds second place with regard to the percentage of bessemer ore shipped, and the Mesabi third, but the percentage of bessemer has decreased much faster in both these ranges than in the total. Of Gogebic ore shipped in 1902, 78.2 per cent was bessemer and only 44.9 per cent in 1919, while 80.7 per cent of Mesabi shipments were bessemer in 1902 and only 35.7 per cent in 1919. As compared with these, 59.9 per cent of the total tonnage shipped in 1902 was bessemer, while in 1919 the percentage was 32.2.

It will be noted that there is a very considerable similarity in the average analyses of the Gogebic and Mesabi ranges during the entire period covered.

As compared with the nearly stationary tonnage and decreasing per-

Averages of Total, All Grades

Gogebic

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Average Moisture
1919	5,856,226	52.95	.063	7.74	.63	11.66
1918	7,884,523	52.52	.069	7.88	.72	11.90
1917	7,481,405	52.75	.068	8.08	.72	11.58
1916	8,372,406	53.21	.064	7.60	.64	11.63
1915	5,389,749	53.74	.066	7.35	.61	11.18
1914	3,518,765	54.00	.061	7.15	.52	11.28
1913	4,370,192	53.66	.053	7.74	.51	11.05
1912	4,892,285	53.74	.055	7.94	.55	10.84
1911	2,410,961	54.00	.051	7.28	.57	11.08
1910	4,289,262	53.39	.050	7.90	.66	11.00
1909	3,951,502	52.83	.052	8.01	.78	11.66
1908	2,669,488	53.23	.052	7.87	.64	11.05
1907	3,568,251	53.14	.050	7.46	.85	11.18
1906	3,603,388	53.57	.051	7.06	.76	11.07
1905	3,613,595	54.43	.049	6.05	.67	11.14
1904	2,389,026	54.66	.045	6.05	.63	10.78
1903	2,864,001	55.02	.048	5.51	.80	10.60
1902	3,388,918	55.12	.048	5.50	.69	10.87

Marquette

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Average Moisture
1919	2,636,186	51.06	.148	11.87	.37	9.63
1918	4,248,869	52.31	.112	10.45	.37	9.42
1917	4,570,928	51.56	.132	9.70	.42	10.31
1916	5,264,627	51.90	.125	9.89	.41	9.93
1915	5,937,937	52.57	.113	10.22	.41	9.81
1914	2,393,886	51.60	.102	10.53	.42	9.26
1913	3,832,319	51.94	.111	9.82	.40	9.70
1912	3,920,103	52.50	.154	8.81	.49	10.65
1911	2,779,695	51.82	.102	10.54	.45	10.15
1910	4,254,273	51.36	.121	9.93	.40	9.70
1909	4,103,406	52.68	.098	9.88	.37	8.76
1908	2,381,453	52.53	.101	9.58	.33	9.90
1907	4,037,768	53.39	.113	9.11	.40	9.33
1906	4,007,789	54.27	.115	8.40	.40	9.20
1905	4,140,599	54.59	.110	8.13	.35	8.80
1904	2,786,275	55.21	.093	7.54	.41	8.32
1903	2,990,848	54.83	.102	7.99	.33	8.37
1902	3,825,694	54.84	.097	8.30	.34	7.61

Menominee

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Average Moisture
1919	4,388,731	50.52	.375	8.23	.57	8.07
1918	6,294,806	50.02	.353	9.42	.53	7.99
1917	5,866,821	50.16	.324	9.34	.60	7.94
1916	6,168,908	50.25	.333	9.43	.59	7.86
1915	4,763,611	50.52	.348	8.72	.60	7.81
1914	2,953,338	49.61	.319	11.76	.45	7.35
1913	4,694,534	49.14	.311	11.19	.53	7.46
1912	4,341,036	49.34	.330	11.44	.55	7.55
1911	3,720,900	49.25	.320	11.80	.51	7.54
1910	4,203,429	49.65	.298	11.54	.38	7.55
1909	4,904,195	49.90	.308	10.87	.34	7.70
1908	2,742,608	49.14	.263	12.99	.41	7.29
1907	4,793,129	49.46	.259	12.62	.53	7.40
1906	5,035,271	49.68	.254	12.61	.54	7.21
1905	4,425,971	50.46	.236	12.52	.37	7.10
1904	3,038,833	51.21	.239	11.60	.36	7.39
1903	3,592,418	50.72	.189	11.84	.50	6.85
1902	4,350,783	51.11	.179	11.82	.35	7.00

Vermilion

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Average Moisture
1919	872,061	58.60	.059	6.66	.12	5.85
1918	1,157,674	57.90	.057	7.71	.14	5.72
1917	1,482,948	58.02	.055	7.55	.14	5.69
1916	1,926,332	57.95	.054	7.55	.11	5.87
1915	1,704,789	58.02	.051	6.87	.14	6.28
1914	1,004,170	58.56	.058	6.38	.13	5.94
1913	1,547,832	58.77	.052	6.37	.12	5.78
1912	1,826,934	59.18	.054	6.09	.11	5.52
1911	1,075,535	59.59	.051	6.01	.11	5.07
1910	1,192,415	60.14	.054	5.18	.11	5.02
1909	1,097,127	60.49	.053	4.84	.11	5.06
1908	832,924	60.57	.048	4.55	.12	5.14
1907	1,668,049	60.42	.043	5.08	.10	5.28
1906	1,785,871	60.60	.044	4.73	.09	5.31
1905	1,648,610	61.14	.047	4.37	.13	4.95
1904	1,269,689	60.37	.045	4.53	.12	5.13
1903	1,659,932	60.86	.048	4.55	.12	4.85
1902	2,045,892	61.65	.052	3.95	.12	4.32

Cuyuna

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Average Moisture
1919	1,777,266	48.35	.292	8.60	1.99	11.54
1918	2,399,790	43.87	.200	9.85	5.15	11.47
1917	2,220,263	48.06	.199	8.92	2.52	10.92
1916	1,421,644	48.31	.179	9.07	2.32	11.32
1915	897,782	50.06	.224	9.06	.50	10.75
1914	736,573	50.09	.193	10.02	.27	11.59

Total, Old Range

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Average Moisture
1919	15,530,470	51.73	.191	8.62	.70	9.96
1918	21,985,664	51.10	.172	9.03	1.05	9.93
1917	21,622,365	51.68	.164	8.81	.77	9.85
1916	23,153,917	52.22	.156	8.70	.64	9.74
1915	16,693,868	52.79	.164	8.46	.51	9.37
1914	10,606,732	52.40	.151	9.32	.42	9.25
1913	14,444,877	52.28	.152	9.27	.45	8.96
1912	14,980,358	52.73	.161	8.96	.48	9.19
1911	9,987,091	52.23	.166	9.73	.66	8.86
1910	13,939,379	52.22	.147	9.39	.45	9.05
1909	14,056,230	52.36	.155	9.30	.46	8.92
1908	8,626,473	52.44	.132	9.65	.43	8.97
1907	14,067,197	52.82	.138	9.41	.53	8.66
1906	14,432,319	53.28	.139	9.08	.50	8.50
1905	13,828,775	54.01	.126	8.54	.41	8.41
1904	9,483,823	55.45	.122	8.06	.41	8.21
1903	11,107,199	54.45	.108	8.09	.47	7.92
1902	13,611,287	54.74	.104	8.05	.40	7.73

Mesabi

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Average Moisture
1919	31,136,408	51.50	.066	7.75	.75	12.03
1918	39,987,207	51.39	.066	7.63	.78	12.04
1917	40,899,100	51.25	.065	7.60	.75	12.47
1916	42,037,986	50.64	.065	7.61	.78	12.60
1915	29,189,620	50.74	.066	7.96	.72	12.39
1914	20,827,364	50.81	.067	7.65	.76	12.35
1913	33,461,455	50.97	.063	7.50	.76	12.51
1912	30,882,865	51.20	.064	7.44	.73	11.90
1911	21,514,092	51.12	.063	7.75	.72	11.90
1910	28,426,801	51.42	.065	7.27	.76	12.05
1909	27,903,438	51.59	.062	6.60	.79	12.56
1908	17,117,611	52.66	.059	6.24	.70	11.95
1907	26,162,592	52.95	.058	5.48	.62	11.87
1906	23,168,539	53.44	.057	5.56	.62	11.68
1905	19,846,629	54.24	.051	4.86	.56	11.45
1904	11,952,165	55.45	.047	4.58	.54	10.26
1903	12,622,751	55.19	.047	4.75	.52	10.38
1902	13,165,814	56.07	.045	4.35	.52	9.71

Total

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Average Moisture
1919	46,666,878	51.57	.108	8.04	.73	11.34
1918	61,972,871	51.29	.104	8.12	.87	11.29
1917	62,521,465	51.40	.099	8.02	.76	11.57
1916	65,191,903	51.20	.097	8.00	.73	11.58
1915	45,883,488	51.49	.100	8.14	.64	11.29
1914	31,434,096	51.34	.095	8.21	.65	11.30
1913	47,906,332	51.37	.090	8.03	.66	11.44
1912	45,863,223	51.69	.096	7.93	.65	11.01
1911	31,501,183	51.47	.095	8.38	.64	10.93
1910	42,366,180	51.68	.092	7.97	.66	11.06
1909	41,959,668	51.85	.093	7.51	.68	11.33
1908	25,744,084	52.58	.083	7.39	.61	10.95
1907	40,229,789	52.91	.086	6.86	.59	10.75
1906	37,600,858	53.38	.088	6.91	.57	10.46
1905	33,675,404	54.14	.082	6.37	.50	10.20
1904	21,435,988	55.02	.080	6.12	.48	9.36
1903	23,729,950	54.84	.075	6.31	.50	9.23
1902	26,777,101	55.39	.075	6.23	.46	8.71

centage of bessemer ores, low phosphorus nonbessemer shows a constant increase in tonnage, and a very rapid increase in percentage. It increased from 29 per cent in 1902 to 56 per cent in 1915, since which time it has declined slightly, being 52.9 per cent in 1919. The tonnage increased from 7,770,805 in 1902 to 35,618,894 in 1916, which is the high point.

The high phosphorus nonbessemer ores also have increased in about the same ratio, although the tonnage is much smaller. The percentage was 11.8 in 1902, and 29.9 in 1919. The tonnage was 1,608,664 in 1902, 5,456,289 in 1917 when the highest mark was reached, and 4,648,067 in 1919.

Manganiferous ores show almost no change in percentage from 1902 to 1916 which is the first year in which the Cuyuna range ores were included, but since then the increase has been comparatively rapid. Silicious ores show a steady decline both in tonnage and percentage.

As it is in the percentage of phosphorus that the divisions in these tables are based primarily it is important to note that the average for this element remains fairly constant in most cases, although the totals for each range show a steady if rather slow increase. The average for all ranges increased from 0.075 per cent in 1902 to 0.108 per cent in 1919.

The effect of the development of the Cuyuna range is seen in the increased percentage of manganese. This is noticeable in the total Old range and even in the grand total. The greatly increased demand for

Low-phosphorus, Nonbessemer Ores

(Phosphorus .180 and under)

Gogebic

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Moisture	Per cent of total
1919.....	2,723,117	53.26	.080	6.55	.46	12.17	46.5
1918.....	3,932,119	52.94	.089	6.80	.50	12.53	49.9
1917.....	3,807,237	53.07	.088	6.85	.43	12.27	50.9
1916.....	3,954,565*	53.28	.086	7.00	.51	12.05	47.2
1915.....	2,660,648	53.91	.089	6.58	.55	11.57	49.4
1914.....	1,268,584	53.88	.095	6.74	.41	11.77	36.1
1913.....	1,295,766	53.20	.080	7.91	.47	11.41	29.7
1912.....	1,608,518	53.44	.084	8.30	.44	11.13	32.9
1911.....	613,739	52.98	.086	8.47	.48	11.67	25.5
1910.....	827,685	52.13	.080	9.45	.43	11.72	19.3
1909.....	972,103	51.72	.082	8.78	.58	11.95	24.6
1908.....	642,604*	52.44	.091	8.19	.57	12.38	24.1
1907.....	644,560*	52.39	.088	8.34	.58	12.14	18.1
1906.....	446,893	52.23	.116	8.60	.65	11.98	12.4
1905.....	345,161	52.06	.119	9.38	.53	11.61	9.6
1904.....	329,004	52.56	.070	8.34	.59	11.52	13.8
1903.....	409,800	52.12	.091	7.53	.58	10.24	14.3
1902.....	517,504	53.05	.083	8.98	.63	10.49	15.3

Marquette

1919.....	1,629,533	52.30	.098	8.88	.33	10.54	61.8
1918.....	2,999,819	52.34	.099	8.95	.42	10.08	70.6
1917.....	2,722,581	52.60	.100	8.09	.40	10.41	59.6
1916.....	3,445,875	52.53	.099	7.94	.43	10.13	65.5
1915.....	2,818,786	53.40	.098	8.26	.41	10.32	71.6
1914.....	1,646,300	52.72	.103	7.55	.47	9.71	68.8
1913.....	2,862,994	52.61	.099	8.22	.42	9.87	74.7
1912.....	2,676,002	53.03	.106	7.44	.38	10.32	68.3
1911.....	1,630,439	52.54	.106	8.50	.46	10.52	58.7
1910.....	2,653,220	51.44	.100	8.11	.42	9.89	62.4
1909.....	2,617,998†	52.81	.088	8.16	.46	9.04	63.8
1908.....	1,311,113	52.54	.094	8.36	.40	10.32	55.1
1907.....	2,581,474	53.29	.091	8.52	.44	9.38	63.9
1906.....	2,712,798	54.30	.100	7.56	.44	9.37	67.7
1905.....	2,670,859	54.51	.108	7.25	.40	9.20	64.5
1904.....	1,806,517	54.82	.107	6.64	.44	8.92	64.8
1903.....	1,538,529	54.82	.114	6.97	.36	9.09	51.4
1902.....	2,325,731	55.39	.108	6.67	.34	7.73	60.8

Menominee

1919.....	846,857	50.72	.074	9.77	.23	7.17	19.3
1918.....	1,200,981	51.16	.069	9.71	.23	7.11	19.1
1917.....	1,238,142	52.09	.067	8.56	.23	7.25	21.1
1916.....	1,345,883	53.04	.067	7.84	.20	6.98	21.8
1915.....	1,182,076	52.31	.079	7.78	.21	6.91	24.8
1914.....	798,910	51.97	.077	9.48	.21	7.25	27.1
1913.....	1,385,571	51.35	.079	8.70	.23	6.91	29.5
1912.....	1,169,346	51.55	.078	10.55	.19	6.71	26.9
1911.....	760,540	52.53	.074	9.31	.16	7.44	20.4
1910.....	1,206,788	51.97	.072	9.47	.24	7.30	28.7
1909.....	1,310,372	52.80	.070	7.82	.17	7.38	26.7
1908.....	733,064	51.97	.066	10.67	.20	6.99	26.7
1907.....	1,576,950	52.00	.069	10.57	.30	7.15	32.9
1906.....	1,673,227	53.01	.066	9.50	.30	6.71	33.2
1905.....	1,705,970	53.67	.070	8.96	.29	6.64	38.5
1904.....	1,107,922	54.69	.071	6.95	.29	7.14	36.5
1903.....	1,570,709	54.24	.067	7.59	.32	6.90	43.7
1902.....	1,973,850	54.31	.070	7.93	.29	7.21	45.4

Vermilion

1919.....	152,617	60.19	.151	8.76	.10	2.14	17.5
1918.....	229,338	59.10	.135	9.62	.12	2.82	19.8
1917.....	373,260	57.89	.100	10.17	.19	3.74	35.2
1916.....	459,630	58.81	.100	8.91	.09	3.77	23.9
1915.....	312,973	58.39	.107	8.24	.09	4.34	18.4
1914.....	262,946	58.80	.110	7.06	.12	4.36	26.2
1913.....	347,158	58.63	.098	8.10	.11	4.08	22.4
1912.....	457,382	58.78	.100	7.00	.11	4.72	25.0
1911.....	185,116	59.60	.112	6.41	.09	4.09	17.2
1910.....	259,268	60.25	.112	5.71	.11	4.08	21.8
1909.....	200,437	61.24	.113	4.70	.11	3.75	18.3
1908.....	134,231	61.22	.092	5.06	.10	3.58	16.1
1907.....	122,215	63.94	.108	4.04	.08	1.93	7.3

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Moisture	Per cent of total
1906.....	190,550	64.58	.080	3.51	.09	1.81	10.7
1905.....	235,603	64.33	.097	4.18	.12	1.36	14.3
1904.....	70,005	66.47	.131	2.85	.10	.71	5.5
1903.....	255,934	62.98	.089	3.93	.12	2.70	15.4
1902.....	406,784	62.00	.100	3.26	.08	2.75	19.9

Cuyuna

1919.....	226,727	52.36	.068	9.17	.27	11.65	12.8
1918.....	385,246	48.18	.127	8.73	.62	12.06	16.1
1917.....	516,233	50.81	.130	9.98	.46	11.47	23.3
1916.....	337,645	51.14	.114	8.55	.28	12.46	23.8
1915.....	274,412	50.35	.175	8.18	.30	11.90	30.6
1914.....	325,170	51.85	.073	9.29	.21	12.49	44.1

Total, Old Range

1919.....	5,578,851	52.74	.111	7.89	.37	10.64	35.9
1918.....	8,747,503	52.44	.092	8.10	.43	10.67	39.8
1917.....	8,657,453	52.85	.092	7.82	.38	10.55	40.0
1916.....	9,520,093	53.17	.089	7.61	.41	10.25	41.1
1915.....	7,248,895	53.51	.095	7.56	.41	10.03	43.4
1914.....	4,301,910	53.23	.094	7.77	.36	9.59	40.6
1913.....	5,891,489	52.80	.090	8.25	.37	9.17	40.8
1912.....	5,911,198	53.29	.094	8.25	.33	9.39	39.5
1911.....	3,189,834	53.03	.094	8.56	.36	9.63	31.9
1910.....	4,946,961	52.14	.090	8.54	.36	9.26	35.5
1909.....	5,034,621	52.97	.083	8.15	.36	8.92	35.8
1908.....	2,735,258	52.83	.083	8.73	.36	9.46	31.7
1907.....	4,919,187	53.03	.083	9.04	.40	8.83	35.0
1906.....	5,023,468	54.08	.090	8.14	.40	8.43	34.8
1905.....	4,957,593	54.52	.095	7.84	.35	8.11	35.8
1904.....	3,313,448	54.80	.092	6.84	.39	8.40	34.9
1903.....	3,774,972	54.84	.090	7.08	.35	7.87	34.0
1902.....	5,223,869	55.26	.091	7.11	.33	7.42	38.4

Mesabi

1919.....	19,092,807	50.35	.078	7.87	.82	12.77	61.3
1918.....	25,176,874	50.19	.078	7.68	.88	12.89	62.9
1917.....	25,043,735	50.22	.078	7.50	.84	13.33	61.2
1916.....	26,098,801	49.21	.077	7.65	.90	13.42	62.1
1915.....	18,521,286	49.55	.079	7.77	.79	13.31	63.4
1914.....	12,546,529	49.66	.081	7.43	.82	13.20	60.2
1913.....	19,288,838	49.37	.076	7.73	.86	13.44	57.6
1912.....	16,752,682	49.48	.079	7.44	.86	13.19	54.2
1911.....	10,879,763	49.47	.079	7.60	.89	13.09	50.6
1910.....	15,081,459	49.75	.081	7.29	.84	13.19	53.1
1909.....	15,244,270	50.12	.076	6.52	.90	13.68	54.6
1908.....	7,513,481	50.85	.077	6.34	.84	12.37	43.9
1907.....	9,654,461	50.94	.080	5.35	.74	13.11	36.9
1906.....	7,629,141	50.97	.083	6.04	.79	13.22	32.9
1905.....	5,932,490	51.62	.070	5.12	.71	13.06	29.9
1904.....	2,645,470	52.40	.070	5.02	.67	11.84	22.1
1903.....	3,171,423	53.19	.065	4.74	.58	11.45	25.1
1902.....	2,546,936	53.55	.066	5.23	.54	10.26	19.3

Total Low-Phosphorus Nonbessemer

1919.....	24,671,658	50.89	.086	7.88	.72	12.29	52.9
1918.....	33,924,377	50.77	.082	7.79	.76	12.33	54.7
1917.....	33,701,188	50.90	.082	7.58	.73	12.62	53.9
1916.....	35,618,894	50.26	.080	7.64	.77	12.57	54.6
1915.....	25,770,181	50.67	.083	7.71	.68	12.39	56.3
1914.....	16,848,439	50.57	.084	7.52	.70	12.28	53.6
1913.....	25,180,327	50.17	.079	7.85	.75	12.44	52.6
1912.....	22,663,880	50.48	.083	7.65	.70	12.20	49.4
1911.....	14,069,597	50.28	.082	7.82	.78	12.31	44.7
1910.....	20,028,420	50.34	.084	7.60	.73	12.22	47.3
1909.....	20,278,891	50.83	.076	6.93	.77	12.49	48.3
1908.....	10,248,739	51.38	.078	6.90	.72	12.31	39.8
1907.....	14,573,648	51.64	.081	6.80	.63	11.67	36.3
1906.....	12,652,609	52.20	.086	6.88	.64	11.21	33.6
1905.....	10,890,083	52.94	.082	6.36	.56	10.81	32.2
1904.....	5,958,918	53.73	.082	6.02	.52	9.94	27.8
1903.....	6,946,395	54.09	.079	6.01	.46	9.50	29.2
1902.....	7,770,805	54.70	.082	6.48	.39	8.35	29.1

*Includes small tonnage above .180 phos.
†Includes small tonnage above 2.00 manganese.

High-phosphorus, Nonbessemer Ores

(Phosphorus above .180)

Marquette

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Moisture	Per cent of total
1919.....	318,846	51.89	.628	5.08	.59	11.36	12.1
1918.....	241,068	51.79	.545	6.14	.54	11.24	5.7
1917.....	716,695	51.04	.392	7.02	.65	13.40	15.7
1916.....	594,451	51.96	.438	6.71	.67	12.69	11.3
1915.....	251,648	50.93	.528	7.72	.60	12.35	6.4
1914.....	137,749	49.98	.354	7.35	.44	12.07	5.8
1913.....	278,824	51.03	.400	7.05	.49	12.21	7.3
1912.....	448,757	49.88	.623	7.12	.79	14.42	11.4
1911.....	168,830	48.51	.400	8.35	.39	12.96	6.1
1910.....	418,625	48.78	.454	8.51	.44	12.98	9.8
1909.....	299,829	47.16	.378	9.97	.35	12.52	7.3
1908.....	232,337	48.13	.341	8.73	.28	12.96	9.7
1907.....	392,668	49.48	.440	8.65	.55	13.91	9.7
1906.....	339,403	51.74	.422	7.68	.56	13.36	8.5
1905.....	218,644	50.95	.477	7.17	.37	11.57	5.3
1904.....	68,690	50.88	.420	6.27	.31	11.47	2.5
1903.....	212,498	48.33	.342	8.39	.21	8.18	7.1
1902.....	204,394	49.43	.325	6.82	.23	8.50	5.3

Menominee

1919.....	3,136,693	51.03	.476	7.50	.34	8.52	71.5
1918.....	4,179,419	51.02	.464	7.18	.35	8.73	66.4
1917.....	3,527,892	51.10	.460	6.86	.34	8.78	60.1
1916.....	3,743,367	51.09	.441	7.16	.34	8.64	60.7
1915.....	2,814,498	51.21	.465	7.15	.32	8.56	59.1
1914.....	1,563,990	51.39	.492	7.14	.32	8.50	53.0
1913.....	2,383,665	50.22	.470	8.31	.31	8.44	50.8
1912.....	2,305,025	50.45	.475	8.30	.32	8.54	53.1
1911.....	1,952,485	50.88	.488	7.31	.34	8.14	52.5
1910.....	2,291,607	50.44	.472	7.99	.37	8.19	54.5
1909.....	2,684,998	50.31	.490	8.01	.35	8.38	54.7
1908.....	1,403,299	50.58	.439	7.87	.37	7.98	51.2

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Moisture	Per cent of total
1907.....	1,952,222	51.21	.494	6.31	.46	8.67	40.7
1906.....	1,960,418	51.51	.520	5.08	.47	9.05	38.9
1905.....	1,630,223	51.57	.525	6.01	.43	8.47	36.8
1904.....	1,188,615	52.84	.512	5.44	.42	8.43	39.1
1903.....	986,523	52.70	.474	5.50	.50	8.46	37.5
1902.....	1,404,270	52.15	.436	6.12	.41	8.51	32.3

Cuyuna

1919.....	1,192,528	49.58	.247	8.58	.47	11.55	67.1
1918.....	783,694	50.42	.249	8.60	.37	9.92	32.6
1917.....	1,211,702	49.92	.245	7.94	.73	10.24	54.6
1916.....	587,762	50.81	.216	8.66	.36	11.02	41.3
1915.....	623,370	49.93	.246	9.45	.59	10.24	69.4
1914.....	411,403	48.70	.287	10.60	.32	10.87	55.9

Total

1919.....	4,648,067	50.72	.428	7.61	.39	9.49	29.9
1918.....	5,203,181	50.97	.435	7.35	.36	9.03	23.7
1917.....	5,456,289	50.83	.403	7.12	.47	9.71	25.2
1916.....	4,949,085	51.17	.413	7.28	.38	9.44	21.4
1915.....	3,689,516	50.97	.432	7.57	.39	9.10	22.1
1914.....	2,113,142	50.78	.443	7.83	.32	9.20	19.9
1913.....	2,662,489	50.30	.463	8.18	.33	8.83	18.4
1912.....	2,753,782	50.40	.499	8.11	.38	9.50	18.4
1911.....	2,121,315	50.69	.481	7.39	.34	8.52	21.2
1910.....	2,710,232	50.18	.470	8.07	.38	8.93	19.4
1909.....	2,984,827	49.90	.479	8.20	.35	8.80	21.1
1908.....	1,721,390	50.29	.413	8.08	.36	8.95	20.0
1907.....	2,350,902	50.92	.484	6.70	.47	9.56	16.7
1906.....	2,299,821	51.54	.506	5.46	.49	9.68	15.9
1905.....	1,848,867	51.49	.520	6.15	.42	8.83	13.4
1904.....	1,257,305	52.73	.507	5.49	.41	8.59	13.3
1903.....	1,199,021	51.92	.451	6.01	.45	8.41	10.8
1902.....	1,608,664	51.81	.421	6.21	.39	8.51	11.8

Manganiferous Ores

(Manganese 2.00 and over)

Gogebic

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Moisture	Per cent of total
1919....	477,964	48.57	.073	7.44	3.13	13.70	8.1
1918....	785,865	48.38	.074	8.73	3.24	12.95	9.9
1917....	654,006	48.94	.071	9.58	4.00	10.93	8.7
1916....	545,550*	48.43	.062	9.34	3.66	12.15	6.5
1915....	256,588	48.64	.065	10.35	3.52	10.94	4.8
1914....	182,554	49.44	.063	10.19	3.10	10.84	5.2
1913....	208,310	48.92	.055	12.78	3.13	8.81	4.7
1912....	282,124	49.89	.063	10.55	2.79	9.00	5.8
1911....	138,446	50.28	.052	10.43	2.95	10.23	5.7
1910....	326,717	49.12	.058	11.41	3.93	8.77	7.6
1909....	288,464	47.76	.053	11.47	4.92	9.02	7.3
1908....	183,511	48.64	.053	11.87	5.87	9.25	6.8
1907....	421,106	50.45	.050	8.12	3.88	10.31	11.8
1906....	363,254	50.33	.049	7.95	3.66	10.50	10.1
1905....	194,497	50.20	.045	5.69	4.64	11.65	5.4
1904....	99,857	50.62	.061	7.06	3.83	9.94	4.2
1903....	178,653	50.25	.065	5.68	5.20	9.80	6.2
1902....	222,141	52.33	.045	7.21	3.54	11.50	6.5

Menominee

1919.....	151,113	42.41	.525	6.46	7.76	7.27	3.4
1918.....	280,502	44.45	.541	7.20	5.35	7.29	4.5
1917.....	280,682	43.74	.511	7.43	6.80	7.32	4.8
1916.....	495,712	45.82	.588	7.25	4.01	7.31	8.0
1915.....	427,630	45.84	.580	7.48	3.90	7.27	9.0
1914.....	170,274	45.68	.620	7.58	3.69	7.39	5.8
1913.....	375,037	46.12	.582	7.20	3.61	7.16	8.0
1912.....	411,125	46.29	.577	7.60	3.37	7.16	9.5
1911.....	285,662	46.42	.574	7.02	3.49	7.84	7.7
1910.....	118,659	46.52	.593	6.90	3.21	7.63	2.8
1909.....	147,523	47.07	.568	6.70	2.93	7.14	3.0
1908.....	80,257	45.32	.546	7.46	5.03	6.47	2.9
1907.....	210,762	45.71	.605	6.34	4.82	7.35	4.4
1906.....	186,502	45.76	.604	6.68	5.75	6.60	3.7
1905.....	70,076	47.50	.575	4.75	4.25	7.50	1.6
1904.....	45,338	47.50	.600	5.25	4.00	7.00	1.5
1903.....	157,157	47.50	.570	4.50	4.00	7.85	4.4
1902.....	46,990	48.37	.570	4.83	4.71	7.50	1.1

Cuyuna

1919.....	295,515	39.20	.227	7.92	9.88	11.58	16.6
1918.....	1,120,214	36.83	.205	11.00	10.56	12.44	46.7
1917.....	355,222	35.89	.199	10.28	12.21	13.71	16.4
1916.....	427,370	41.86	.201	9.86	6.99	10.91	30.1

Total, Old Range

1919.....	924,592	44.57	.196	7.43	6.04	11.97	6.0
1918.....	2,186,581	41.96	.201	9.75	7.26	11.96	9.9
1917.....	1,299,910	44.15	.202	9.31	6.91	10.65	6.0
1916.....	1,460,730	45.66	.281	8.68	4.76	10.17	6.3

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Moisture	Per cent of total
1915.....	684,218	46.89	.387	8.55	3.76	8.64	4.1
1914.....	352,828	47.62	.332	8.93	3.38	9.18	3.3
1913.....	583,347	47.12	.394	9.19	3.44	7.75	4.0
1912.....	693,249	47.75	.364	8.80	3.13	7.91	4.6
1911.....	424,108	47.68	.404	8.13	3.31	8.62	4.2
1910.....	445,376	48.43	.200	10.21	3.74	8.47	3.2
1909.....	502,276	47.77	.207	8.72	3.98	8.87	3.6
1908.....	264,884	47.60	.202	10.58	4.22	8.41	3.1
1907.....	631,868	48.86	.235	7.53	4.20	9.32	4.5
1906.....	549,756	48.78	.238	6.84	4.37	9.17	3.8
1905.....	264,573	49.49	.186	5.44	4.54	10.55	1.9
1904.....	145,195	49.65	.229	6.50	3.88	9.02	1.5
1903.....	335,810	48.96	.302	5.13	4.64	8.89	3.0
1902.....	269,131	51.64	.137	4.79	3.74	10.80	2.0

Mesabi

1919.....	807,708	48.56	.080	7.19	2.41	13.09	2.6
1918.....	426,554	47.78	.073	8.39	3.27	11.25	1.1
1917.....	321,395	47.61	.068	8.88	3.20	12.13	.8
1916.....	333,595	48.15	.092	8.24	2.49	12.03	.8
1915.....	196,802	48.38	.097	7.97	2.34	12.90	.7
1914.....	269,462	50.36	.078	7.37	3.96	11.90	1.3
1913.....	298,797	49.02	.089	6.67	2.77	12.98	.9
1912.....	133,905	50.60	.063	10.07	2.43	9.53	.4
1911.....	26,019	47.78	.078	7.10	2.20	13.12	.1
1910.....	205,115	49.47	.074	5.52	2.35	13.08	.7
1909.....	214,034	49.91	.079	6.80	2.62	12.55	.8
1908.....							
1907.....	19,600	46.13	.048	8.00	4.94	11.62	.07
1906.....	167,293	53.73	.045	7.55	2.42	12.14	.7

Total Manganiferous

1919.....	1,732,300	46.43	.142	7.32	4.35	12.49	3.7
1918.....	2,613,135	42.91	.180	9.53	6.61	11.85	4.2
1917.....	1,621,305	44.84	.176	9.22	6.15	10.94	2.6
1916.....	1,794,325	46.13	.246	8.60	4.34	10.52	2.8
1915.....	881,020	47.22	.322	8.42	3.33	9.60	1.9
1914.....	622,290	48.81	.222	8.25	3.63	10.35	2.0
1913.....	882,144	47.43	.290	8.34	3.21	9.52	1.8
1912.....	827,154	48.22	.315	9.01	3.02	8.17	1.8
1911.....	450,129	47.68	.384	8.07	3.25	8.88	1.4
1910.....	650,491	48.76	.161	8.73	3.30	9.92	1.5
1909.....	716,310	48.41	.169	8.15	3.57	9.97	1.7
1908.....	264,884	47.60	.202	10.58	4.22	8.41	1.0
1907.....	651,468	48.78	.229	7.54	4.22	9.39	1.0
1906.....	717,049	49.93	.193	5.42	3.92	9.87	1.9
1905.....	264,573	49.49	.186	5.44	4.54	10.55	0.8
1904.....	145,195	49.65	.229	6.50	3.88	9.02	0.7
1903.....	335,810	48.96	.302	5.13	4.64	8.89	1.4
1902.....	269,131	51.64	.137	4.79	3.74	10.80	1.0

*Includes small tonnages of ore above 18.00 silica.

manganiferous ores was created by the shutting off of imports of high manganese ore during the war, and its effect can also be traced in the manganese tables of the Gogebic and Menominee ranges. In 1919 there was little demand for this class of ore and it remains to be seen whether it can compete with foreign ore under normal conditions.

The average content of silica in ores of all ranges, except the Menominee, shows a steady increase, although the fluctuations vary more than in the other elements. The average of the Menominee range while showing rather wide fluctuations, remained about constant until 1914 and has decreased very rapidly since that time, the percentages being 11.76 in 1914 and 8.23 in 1919. This is not due to any decrease of the amount of silica in the standard bessemer and nonbessemer ores, but rather to a decrease in the tonnage of high-silicious ores shipped, and is largely the result of the exhaustion of the Pewabic mine.

The Vermillion range produces the greatest percentage of bessemer ore, and also the highest grade of ore, but the tonnage shows a gradual decrease. This is due to the fact that practically no new ore bodies have been developed, and some of the old mines are becoming exhausted.

The accompanying tables and charts showing the average analyses of Lake Superior iron ores represent the actual quantitative average analyses of 97 per cent of all ore shipped during the years 1902 to 1919 inclusive. The method of calculation used in working out these tables was first to obtain the tonnage of each grade of ore shipped in a given year, and the analysis. Then to determine the average iron content, the tonnage of

Average Analyses of Bessemer Ores

Gogebic

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Moisture	Per cent of total
1919.....	2,626,868	53.62	.042	8.68	.36	10.81	44.9
1918.....	3,103,885	53.40	.042	8.46	.36	10.88	39.4
1917.....	2,940,287	53.70	.042	8.44	.38	10.93	39.3
1916.....	3,872,291	53.82	.041	7.98	.36	11.13	46.3
1915.....	2,440,584	54.18	.040	7.64	.37	10.84	45.3
1914.....	2,067,627	54.48	.039	7.14	.36	11.01	58.8
1913.....	2,866,116	54.21	.040	7.29	.34	11.06	65.6
1912.....	3,001,643	54.26	.041	7.51	.40	10.85	61.4
1911.....	1,648,501	54.72	.040	6.49	.39	10.95	68.4
1910.....	3,132,902	54.18	.041	7.12	.38	11.05	73.0
1909.....	2,671,996	53.87	.042	7.25	.42	11.86	67.6
1908.....	1,833,331	53.99	.039	7.30	.35	10.77	68.7
1907.....	2,478,298	53.85	.041	6.97	.41	11.11	69.5
1906.....	2,793,241	54.21	.041	6.70	.40	11.00	77.5
1905.....	3,073,937	54.97	.041	5.70	.43	11.05	85.1
1904.....	1,960,165	55.21	.040	5.61	.48	10.70	82.0
1903.....	2,275,548	55.92	.039	5.14	.49	10.72	79.5
1902.....	2,649,273	55.76	.042	4.88	.46	10.88	78.2

Marquette

1919.....	313,703	56.56	.035	8.08	.16	7.99	11.9
1918.....	650,406	56.03	.037	8.03	.14	6.79	15.3
1917.....	781,952	52.83	.038	8.12	.24	9.11	17.1
1916.....	690,283	54.90	.037	8.91	.24	8.98	13.1
1915.....	566,601	55.27	.039	8.21	.26	9.08	14.4
1914.....	372,185	54.10	.038	8.62	.32	10.00	15.5
1913.....	467,247	53.54	.038	9.21	.35	10.35	12.2
1912.....	503,342	55.18	.040	7.79	.26	10.37	12.8
1911.....	696,062	54.40	.038	9.01	.34	10.10	25.0
1910.....	879,124	55.48	.044	8.87	.29	8.93	20.7
1909.....	884,978	57.59	.045	6.94	.20	8.36	21.6
1908.....	698,036	56.04	.045	7.31	.25	9.26	29.3
1907.....	890,249	56.97	.045	7.39	.22	8.10	22.0
1906.....	774,983	57.46	.046	6.87	.24	8.01	19.3
1905.....	1,059,980	57.56	.046	6.60	.19	7.76	25.6
1904.....	784,542	58.54	.043	5.61	.39	7.41	28.2
1903.....	1,072,978	58.18	.045	5.38	.32	8.16	35.9
1902.....	1,054,757	58.26	.042	5.42	.36	8.26	27.6

Menominee

1919.....	211,332	51.05	.043	8.40	.25	6.51	4.8
1918.....	303,265	51.06	.044	7.73	.25	6.04	4.8
1917.....	461,013	51.99	.045	7.69	.23	6.89	7.9
1916.....	177,979	53.06	.040	8.51	.18	7.93	2.9
1915.....	126,507	55.20	.035	8.64	.07	6.95	2.7
1914.....	59,380	56.96	.026	6.75	.09	7.10	2.0
1913.....	107,837	55.34	.029	7.92	.10	6.97	2.3
1912.....	85,389	55.21	.025	10.21	.07	7.03	2.0
1911.....	105,643	54.56	.033	8.42	.04	7.34	2.8
1910.....	159,575	55.02	.044	11.20	.03	7.54	3.8
1909.....	292,031	53.84	.042	9.40	.13	7.40	6.0
1908.....	93,649	55.53	.034	10.24	.08	7.46	3.4
1907.....	161,765	56.61	.034	8.40	.19	7.30	3.4
1906.....	234,732	55.90	.036	8.82	.13	7.39	4.7
1905.....	160,727	56.80	.032	7.42	.13	7.59	3.6
1904.....	102,381	57.54	.027	6.42	.13	7.78	3.4
1903.....	104,669	57.79	.021	7.45	.13	7.97	2.9
1902.....	86,018	57.71	.017	5.73	.16	8.31	2.0

Vermilion

1919.....	719,444	58.26	.039	6.21	.12	6.04	82.5
1918.....	928,336	57.61	.040	7.24	.15	6.44	80.2
1917.....	1,109,688	58.06	.040	6.67	.13	6.35	74.8
1916.....	1,466,702	57.68	.040	7.12	.11	6.53	76.1
1915.....	1,391,816	57.94	.039	6.56	.15	6.71	81.6
1914.....	741,224	58.48	.039	6.14	.13	6.51	73.8
1913.....	1,200,674	58.81	.039	5.87	.12	6.28	77.6
1912.....	1,369,602	59.31	.038	5.78	.11	5.78	75.0
1911.....	890,419	59.59	.038	5.92	.11	5.27	82.8
1910.....	933,147	60.11	.038	5.03	.10	5.29	78.2
1909.....	896,690	60.32	.039	4.88	.12	5.35	81.7
1908.....	698,693	60.44	.039	4.45	.13	5.44	83.9
1907.....	1,545,834	60.14	.037	5.16	.11	5.55	92.7
1906.....	1,595,321	60.13	.039	4.87	.09	5.73	89.3
1905.....	1,413,007	60.61	.039	4.41	.13	5.55	85.7
1904.....	1,199,684	60.01	.040	4.63	.13	5.39	94.5
1903.....	1,403,998	60.48	.041	4.66	.12	5.24	84.6
1902.....	1,639,108	61.55	.040	4.12	.13	4.71	80.1

Cuyuna

1919.....	62,496	53.86	.039	9.97	.06	10.86	3.5
1918.....	111,636	53.83	.043	9.95	.09	10.50	4.6
1917.....	127,106	54.19	.042	9.81	.07	10.06	5.7
1916.....	68,867	53.23	.044	10.25	.11	10.86	4.8

Total, Old Range

1919.....	3,933,843	54.57	.041	8.18	.29	9.59	25.3
1918.....	5,097,528	54.37	.041	8.17	.28	9.29	23.2
1917.....	5,420,046	54.33	.041	8.00	.29	9.37	25.1
1916.....	6,276,122	54.81	.041	7.92	.28	9.72	27.1
1915.....	4,525,508	55.50	.039	7.41	.28	9.24	27.1
1914.....	3,240,416	55.39	.039	7.07	.30	8.79	30.6
1913.....	4,641,874	55.36	.039	7.13	.28	9.65	32.1
1912.....	4,959,976	55.76	.040	7.11	.30	9.34	33.1
1911.....	3,340,625	55.95	.039	6.93	.30	9.15	33.4
1910.....	5,104,748	55.52	.041	7.17	.30	9.52	36.6
1909.....	4,745,695	55.78	.042	6.88	.30	9.70	33.8
1908.....	3,323,709	55.82	.040	6.67	.27	9.24	38.5
1907.....	5,076,146	56.40	.041	6.54	.28	8.76	36.1
1906.....	5,398,277	56.50	.041	6.28	.27	8.86	37.4
1905.....	5,707,651	56.90	.041	5.59	.31	8.98	41.3
1904.....	4,046,772	57.34	.040	5.34	.34	8.41	42.7
1903.....	4,857,193	57.78	.040	5.10	.34	8.51	43.7
1902.....	5,429,156	58.03	.041	4.77	.34	8.47	39.9

Mesabi

1919.....	11,104,863	53.74	.044	7.45	.51	10.68	35.7
1918.....	14,266,072	53.65	.044	7.42	.53	10.57	35.7
1917.....	15,093,216	53.17	.044	7.41	.55	11.09	36.9
1916.....	15,605,590	53.10	.046	7.54	.54	11.24	37.1
1915.....	10,471,532	52.90	.043	8.31	.56	10.76	35.9
1914.....	8,011,373	52.62	.045	8.00	.55	11.03	36.5
1913.....	13,763,900	53.31	.044	7.11	.57	11.21	41.1
1912.....	13,996,278	53.25	.047	7.40	.56	10.37	45.3
1911.....	10,608,310	52.81	.046	7.90	.54	10.66	49.3
1910.....	12,971,239	53.42	.046	7.11	.64	10.76	45.6
1909.....	12,318,334	53.46	.044	6.57	.63	11.23	44.1
1908.....	9,584,716	54.08	.044	6.14	.59	10.87	56.0
1907.....	16,376,333	54.17	.046	5.47	.55	11.14	62.6
1906.....	15,372,105	54.66	.044	5.37	.51	10.92	66.3
1905.....	13,914,139	55.35	.042	4.74	.50	10.77	70.1
1904.....	9,306,695	56.32	.040	4.45	.50	9.81	77.9
1903.....	9,451,328	55.86	.040	4.75	.50	10.02	74.9
1902.....	10,618,878	56.67	.039	4.14	.52	9.58	80.7

Total Bessemer

1919.....	15,038,706	53.96	.043	7.64	.45	10.40	33.2
1918.....	19,363,600	53.84	.043	7.62	.46	10.23	31.2
1917.....	20,513,262	53.48	.043	7.57	.48	10.64	32.8
1916.....	21,881,712	53.59	.044	7.65	.47	10.80	33.6
1915.....	14,997,040	53.68	.042	8.04	.48	10.30	32.7
1914.....	11,251,789	53.42	.043	7.73	.48	10.68	35.8
1913.....	18,405,774	53.83	.043	7.11	.49	10.82	38.4
1912.....	18,956,254	53.91	.045	7.33	.49	10.10	41.3
1911.....	13,948,935	53.56	.044	7.67	.48	10.30	44.3
1910.....	18,075,987	54.01	.045	7.12	.54	10.41	42.7
1909.....	17,064,029	54.10	.044	6.66	.54	9.15	40.7
1908.....	12,908,425	54.28	.043	6.31	.51	10.45	50.1
1907.....	21,452,479	54.70	.045	5.72	.49	10.58	58.3
1906.....	20,770,382	55.14	.043	5.60	.45	10.38	55.3
1905.....	19,621,790	55.80	.042	4.99	.45	10.25	58.3
1904.....	13,353,467	56.63	.040	4.72	.45	9.39	62.2
1903.....	14,308,521	56.51	.040	4.87	.44	9.51	60.2
1902.....	16,048,034	57.13	.040	4.35	.46	9.21	59.9

NOTE—In working out these tables, ores containing not more than .001 per cent of phosphorus, dried, to each unit of iron in the natural condition were classed as bessemer.

Silicious Ores

(Silica 18.00 and over)

Gogebic

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Moisture	Per cent of total
1919.....	28,277	34.09	.045	40.40	.27	6.07	.5
1918.....	62,656	34.14	.041	36.28	.33	8.97	.5
1917.....	79,875	34.02	.043	41.19	.32	8.23	1.1.
1916.....							
1915.....	31,929	47.73	.093	25.47	.47	5.59	.6
1914–12..							
1911.....	10,275	49.91	.022	20.71		6.95	.4
1910.....	1,958	42.38	.045	23.82	.37	12.00	.05
1909.....	18,939	42.12	.047	21.82	.40	9.88	.5
1908.....	10,042	49.22	.034	18.93	.21	9.04	.4
1907.....	24,287	47.62	.026	12.35	.38	8.85	.7

Marquette

1919.....	374,104	40.32	.053	33.81	.50	5.59	14.2
1918.....	357,576	46.03	.068	30.43	.28	7.49	8.4
1917.....	349,700	41.68	.059	31.26	.40	5.92	7.6
1916.....	534,018	43.86	.059	27.28	.20	6.77	10.1
1915.....	300,902	41.07	.048	34.47	.57	4.32	7.6
1914.....	237,652	40.84	.052	36.00	.27	3.41	9.9
1913.....	223,354	41.21	.050	35.16	.17	3.04	5 8
1912.....	292,002*	42.97	.074	25.77	1.38	8.30	7.4
1911.....	284,364	43.37	.062	27.27	.73	6.52	10.2
1910.....	303,304	42.27	.065	30.95	.60	5.73	7.1
1909.....	300,601	42.59	.063	33.35	.22	3.72	7.3
1908.....	139,867*	42.16	.053	33.69	.19	4.07	5.9
1907.....	173,377	45.41	.052	27.73	.16	4.40	4.3
1906.....	180,605	44.87	.049	28.93	.18	4.05	4.5
1905.....	191,116	43.44	.056	29.93	.52	5.83	4.6
1904.....	126,526	42.51	.042	32.63	.37	3.83	4.5
1903.....	166,843	41.66	.056	33.72	.29	3.31	5.6
1902.....	240,812	39.11	.039	37.87	.32	2.75	6.3

Menominee

1919.....	42,736	35.03	.034	37.16	.15	3.34	1.0
1918.....	330,639	36.92	.106	40.14	.10	3.58	5.3
1917.....	359,092	37.02	.089	40.05	.10	3.81	6.1
1916.....	405,967	37.49	.040	38.71	.10	4.28	6.6
1915.....	212,900	38.09	.014	37.29	.09	4.54	4.5
1914.....	360,784	37.34	.011	39.63	.10	4.40	12.2
1913.....	442,424	37.45	.016	38.70	.13	4.32	9.4
1912.....	370,151	37.46	.015	38.28	.12	4.76	8.5
1911.....	616,570	40.45	.027	31.89	.16	5.67	16.6
1910.....	426,800	37.77	.016	37.86	.16	4.78	10.2
1909.....	469,271	37.90	.014	37.95	.11	5.05	9.6
1908.....	432,339	38.97	.019	35.15	.11	5.70	15.8
1907.....	891,430	40.69	.038	32.30	.13	5.12	18.6
1906.....	980,392	39.59	.026	35.38	.17	4.49	19.5
1905.....	858,975	41.03	.024	33.67	.13	5.27	19.4
1904.....	594,577	40.68	.017	33.93	.11	5.75	19.6
1903.....	773,360	40.74	.018	30.62	.18	4.32	21.5
1902.....	839,655	41.33	.018	31.06	.19	3.94	19.3

Total, Old Range

Year	Tonnage	Iron (Natural)	Phos.	Silica	Mang.	Moisture	Per cent of total
1919.....	445,117	39.42	.051	34.55	.46	5.40	2.9
1918.....	750,871	41.03	.082	35.19	.20	5.89	3.4
1917.....	788,667	38.78	.071	36.27	.29	5.19	3.7
1916.....	947,887	41.11	.051	32.19	.18	5.72	4.1
1915.....	545,731	40.30	.038	35.05	.38	4.48	3.3
1914.....	598,436	38.73	.027	38.19	.17	4.01	3.6
1913.....	665,678	38.71	.028	37.51	.14	3.89	4.7
1912.....	662,153	39.89	.041	32.76	.68	6.33	4.4
1911.....	911,209	41.47	.038	30.32	.34	5.95	9.2
1910.....	732,062	39.65	.036	34.96	.34	5.19	5.3
1909.....	788,811	39.79	.033	35.81	.16	4.66	5.6
1908.....	581,232	39.90	.027	34.54	.12	5.35	6.7
1907.....	1,089,094	41.60	.040	31.35	.14	5.09	7.7
1906.....	1,160,997	40.41	.029	34.38	.17	4.62	8.1
1905.....	1,050,091	41.46	.030	32.88	.19	5.37	7.6
1904.....	721,103	41.00	.022	33.70	.14	5.41	7.6
1903.....	940,203	40.91	.025	31.17	.20	4.14	8.5
1902.....	1,080,467	40.84	.023	32.58	.22	3.68	7.9

*Includes small tonnages of ore above 2.00 Mang.

Mesabi

1919.....	131,030	46.86	.043	18.29	.46	10.66	.4
1918.....	117,707	46.40	.041	18.55	.42	11.08	.3
1917.....	440,754	46.67	.039	18.32	.37	10.94	1.1
1916–14..							
1913.....	109,920	48.42	.037	18.44	.92	8.86	.3
1912–11..							
1910.....	168,988	49.11	.024	20.46	.25	7.57	.6
1909.....	126,800	49.22	.030	19.34	.45	8.61	.5
1908.....	19,414	46.43	.031	19.10	.40	11.57	.1
1907.....	112,198	49.28	.034	19.10	.40	12.00	.4

Total, Silicious

1919.....	576,147	41.11	.049	30.85	.46	6.60	1.2
1918.....	868,578	41.76	.077	32.95	.23	6.59	1.5
1917.....	1,229,421	41.61	.060	29.83	.32	7.25	2.0
1916.....	947,887	41.11	.051	32.19	.18	5.72	1.5
1915.....	545,731	40.30	.038	35.05	.38	4.48	1.2
1914.....	598,436	38.73	.027	38.19	.17	4.01	1.9
1913.....	775,598	40.08	.029	34.81	.25	4.60	1.6
1912.....	662,153	39.89	.041	32.76	.68	6.32	1.4
1911.....	911,209	41.47	.038	30.32	.34	5.95	2.9
1910.....	901,050	41.48	.034	32.24	.32	5.64	2.1
1909.....	915,611	41.09	.033	33.53	.20	5.21	2.2
1908.....	600,646	40.12	.028	34.04	.13	5.55	2.3
1907.....	1,201,292	42.32	.039	30.21	.17	5.73	3.0
1906.....	1,160,997	40.41	.029	34.38	.17	4.62	3.1
1905.....	1,050,091	41.46	.030	32.88	.19	5.37	3.1
1904.....	721,103	41.00	.022	33.70	.14	5.41	3.4
1903.....	940,203	40.91	.025	31.17	.20	4.14	4.0
1902.....	1,080,467	40.84	.023	32.58	.22	3.68	4.0

*Includes small tonnage of ore above 2.00 Mang.

each grade was multiplied by the percentage of iron in the ore. This gave the units of iron in such tonnage. By adding the units of iron in the ores of a given group and dividing the result by the total tons the average iron content was obtained. The elements of phosphorus, silica, manganese and moisture were determined in the same manner.

Similar tables have been issued by the Lake Superior Iron Ore association for several years but they were completely revised this year. The ores were all reclassified and additional groups shown. The bessemer tonnages remain practically as before, ores containing not more that 0.001 per cent of phosphorus (dried) to each unit of iron in the natural state being placed in this class. It is true that this practice admits ores of a higher phosphorus content than would be the case if the technical definition of a bessemer ore were adhered to, but it follows as closely as possible the common practice employed in the sale and use of Lake Superior ores. Ores of non-bessemer grade, containing not more than 0.180 per cent of phosphorus, were classed as low phosphorus non-bessemer, and ores having more than 0.180 per cent of phosphorus were classed as high phosphorus nonbessemer. Ores containing 2 per cent and over of manganese were classed as manganiferous, and those having 18 per cent and more of silica, as silicious.

We believe that these tables are now as nearly accurate as it is reasonably possible to make them, and much more nearly so than any which have been prepared in the past. On page 493 of Monograph 52, United States geological survey, there appears a curve showing the decline in grade of Lake Superior iron ores from 1889 to 1907 but it is based upon a comparison of the tons of iron ore consumed with the tons of pig iron produced, and is not considered accurate, as it was assumed that all of the ore shipped is consumed each year, and takes no account of stocks at furnaces and docks which vary greatly from year to year.

Large Hoods and Swinging Platforms Protect Workers in Converter Shop

BY H. L. CAMPBELL

AS a rule, in steel foundries where side-blown converters are used, the auxiliary equipment around the converters is not always arranged so as to give the greatest ease of operation and maximum safety for the workmen. Such arrangements are particularly desirable because converter practice requires a large amount of personal attention and care of the operators. The lining of the converter must be repeatedly inspected and

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kept in repair. The tuyeres must be kept open and the slag removed from the mouth of the converter after each blow.

During the converting process a large amount of slag is blown from the bath. This slag collects in the stack or on the wall at the back of the converter and, when it has accumulated in sufficient quantity, will fall to the floor in large sheets. This produces a hazard for workmen walking behind the converter. Preliminary to the blowing of the metal, it is necessary that the operator inspect the tuyeres and tilt the converter to the proper angle. In order to do this he must go behind the converter where he may be in danger from falling slag which has been deposited. Many attempts have been made to remove the slag from the hood after each blow by means of hammers or chains hung in the stacks, but these methods have proved to be unreliable. A swinging apron may be used to advantage as a protecting cover to the area below the hood when the converter is not blowing. Fig. 2 shows two swinging covers back of the converter. These are hinged to the structural members which support the hoods. They are raised by means of air hoists, *A*, Fig. 1, which are located near the roof of the building and are connected to the covers by chains. The covers are constructed of plate and structural steel. These illustrations are from the installation at the steel foundry of the Industrial Works, Bay City, Mich.

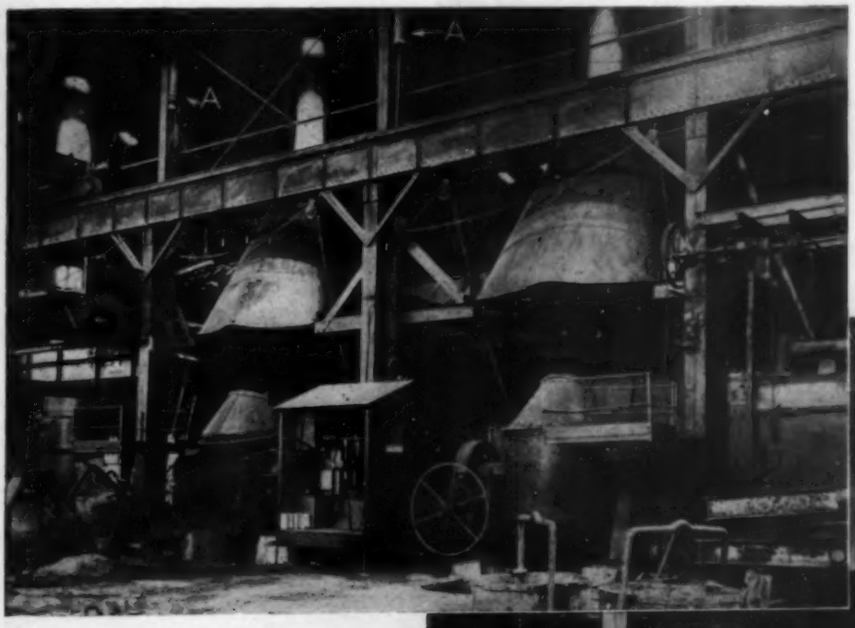
With many installations the hoods over the converters are built too small and are inadequate to carry off the gases produced during the blowing of the metal. In these cases the gases will be deflected by the hood and roll out in clouds into the foundry. If the cupola charging platform is open to the main foundry space, the gases from the converters will be a great annoyance to the workmen who charge the cupola.

Hoods of ample size should be provided to carry away all of the products of combustion from the converter. The hoods should be located so that they will receive the gases when the converters are in a blowing position. Fig. 1 shows two hoods over 2½-ton converters. The area at the mouth of each hood is 108 square feet and the diameter of the stacks leading through the roof is 3 feet.

In many foundries producing converter steel castings, a rudely constructed wooden ladder or stand is provided for the workman who guides the ladle of molten metal from the cupola as it is poured into the mouth of the converter. With the pit open in front of the converter, as is necessary when the converter is in use, it is dangerous to use an unstable ladder near the front of the converter. To avoid this, a platform attached to a column at the side of the converter will serve as a safe means of raising the level of the workman to the position where he can easily control the pouring of the molten metal into the converter. The platforms shown at the side of each converter in both illustrations have hinged connections at the columns and are constructed of structural steel and steel plate. The floor of each platform is 5 x 5 feet and is raised 7 feet from the ground level. When the platforms are not in use they may be swung to one side as shown in Fig. 2.

A pit is provided under each converter to allow the ladles to be lowered when the molten steel is poured from it and, also, to hold the slag which is dumped from the converter after each blow. A safety railing placed around the pit would be a great inconvenience during the operation of the converter. In order to prevent accidents the pit should be covered by a steel plate when the converter is not in use. Fig. 1 shows a cover over the pit in front of the converter at the left. This allows a safe passageway for the men working around the converters.

The operator's booth should be located as near as possible to the converters so that all flame reactions may be clearly observed. The booth should be of fireproof construction and provide protection for the operator. Instruments and levers should be arranged so that all conditions may be watched and controlled from one position.



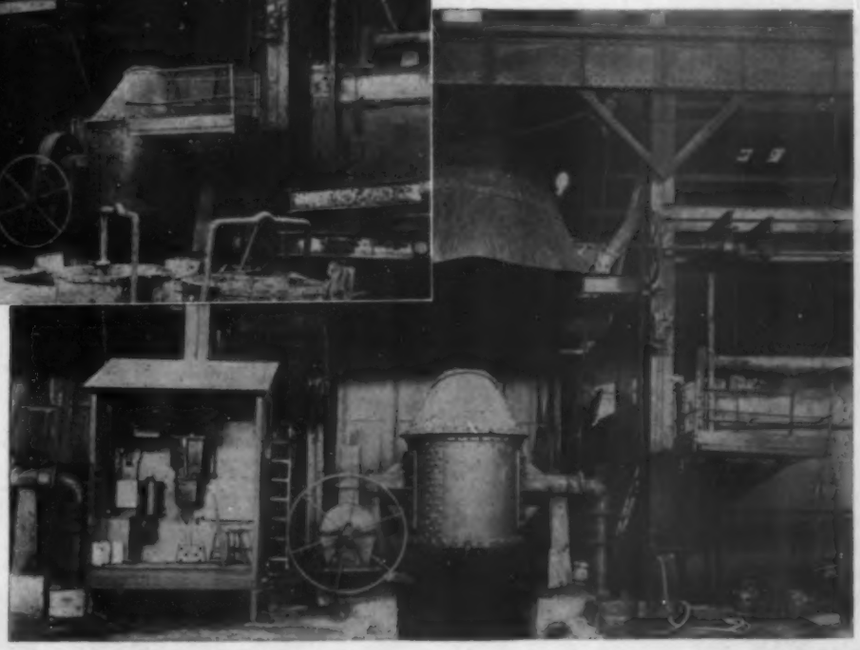


FIG. 1—AT THE LEFT—LEVERS FOR OPERATING THE CONVERTERS ARE CONVENIENTLY LOCATED IN A BOOTH ENCLOSED ON THREE SIDES—NOTE THE SWINGING PLATFORMS FIG. 2—THE STEEL DOORS BEHIND THE CONVERTER WHEN RAISED, CATCH ANY SLAG WHICH FALLS FROM THE HOOD

SLOTTING ATTACHMENT FOR USE ON MILLING MACHINES

Slotting Attachment Fits Milling Machine

The device shown in the accompanying illustration is a slotting attachment designed by the Cleveland Milling Machine Co., Cleveland, to fit its plain and universal milling machines. It is clamped directly to the column and is located in place by two pins at the top of the base. The frame which carries the ram is graduated for close settings and can be rotated through 180 degrees, allowing the attachment to be used in a horizontal position without interfering with the stroke.

The ram is of rectangular section, provided with gibs for taking up wear. The stroke is provisioned for adjustment from 0 to 4¾ inches. The tool block is adjustable, with hardened V jaws to take tools from ¾ to 1 inch. The drive is obtained directly from the milling machine spindle through a link which couples to the crankshaft. Lubrication is taken care of by an oil cup placed outside of the ram and V's which convey the oil to the sliding surfaces.

This attachment, it is pointed out, was designed for use in the tool room for gage, die and jig work. It is proportioned to withstand heavy strains, however, so that it can be forced to maximum capacity when used as a production unit.

Music wire is used extensively in making springs for mechanical devices which are subjected to expansion and contraction. Springs made from this grade of wire require no heat treatment as the steel contains the required elasticity when coiled.

Designs Screw Driver for Repair Work

A screw driver designed to remove rusted screws and perform other jobs where considerable power must be transmitted to the blade of the screw driver has been developed by the Ackland Specialty Co., 146 College street, Springfield, Mass. The tool is in reality a combination ratchet, socket wrench, drill and screw driver, combined with a powerful lever device for holding the tool to the work. The tool holder is of square section which can be engaged at any point with either a ratchet or ordinary wrench. The lower end has a square socket to hold square shanked drills, screw-driver bits, wrench sockets, etc. The upper end terminates in a ball which forms the fulcrum for the socket in the lever bar, to one end of which is applied the pressure to hold the tool to the work. The other end of the bar is secured by a chain secured around the nearest solid support.

SCREW DRIVER AND LEVER ARRANGEMENT FOR HOLDING IT TO THE WORK

Planer Bed Is Repaired by Electric Weld

Reclaiming a large planer put out of commission by a broken bed was recently accomplished by electric welding. The bed of the 60 x 60-inch planer was approximately 22 feet long and was broken in two pieces as indicated by the chalk marks in the accompanying illustration. The welding operation which required six days was conducted in the same shop in which the break occurred by the Electric Welding Co. of America, Brooklyn, N. Y.

In preparing for the welding, the bed was clamped together as shown and set on V blocks of the table on another planer, by which means accurate alignment was secured. All cracks were welded and reinforced in most cases with pieces of boiler plate which were set into the casting and welded at the surface of the patch flush with the original casting. This method produced a job which was not visible after the casting was painted. After completion of the work, the bed was rather roughly handled, being loaded on a truck and shipped by freight to a plant in Canada.

CHALK MARKS INDICATE WHERE THE CAST IRON PLANER BED WAS ELECTRICALLY WELDED

British Discuss Works Economy

Annual Meeting of Iron and Steel Institute in London Replete with Suggestions for Cutting Costs—Nitrates to Be Made With Week-End Power—More Government Control?

European Staff Correspondence

WITH costs in England constantly increasing, wages still on the upgrade, and producers genuinely alarmed over the ultimate market effect of abnormally high selling prices, it was almost inevitable that the underlying theme of most of the papers and discussions at the annual meeting of the British Iron and Steel institute, which took place in London May 6 and 7, should have centered around economy in production. The meeting was one of the most largely attended in the history of the institute, and at the annual banquet at the Connaught rooms, Thursday evening, May 6, over 500 covers were laid.

The keynote of the meeting, economy in production, was sounded at the opening session by Dr. J. E. Stead, the new president. In his masterly inaugural address, the numerous campaigns of British iron and steelmakers during the past fifty years in their ceaseless war against high costs were reviewed and pertinent tactical suggestions for the conduct of future battles were offered. Dr. Stead's thirteen recommendations with reference to blast-furnace operations are set forth on a following page.

Dr. Stead's suggestions along this line were ably seconded in the exhaustive paper on "British Blast-furnace Practice," presented by Fred Clements, The Park Gate Iron & Steel Co., Rotherham, near Sheffield, England. This paper will be presented in an early issue of THE IRON TRADE REVIEW. In the discussion of this paper, together with one by C. H. Ridsdale, engineer, Middlesborough, on the valuation of iron ores, pointed references were made to the "disgraceful coke" now being supplied to British blast furnaces. Dr. Stead said that poor quality fuel has neutralized the economies secured from superheated blast. The improvements in fuel economy resulting from washing the coking coal by the flotation process used for refining ores were described. The consumption of coke made from washed coal was stated to be 2240 pounds per ton of pig iron, compared with 2900 pounds now being consumed in some English furnaces with a 30 per cent ore burden. Another important suggestion in the direction of economy was that offered by Alfred Hutchinson, director, Skinningrove Iron Works, Saltburn-by-the-Sea, England, who said he proposed to take steps to save the week-end waste of power at his works by studying the possibility of utilizing this surplus energy, derived from blast-furnace gas, for the electrolytic production of nitrates. The entire meeting was in fact replete with suggestions looking toward greater economy in production.

Awards Medal to Stainless Steel Inventor

IN THE report of the council, which was read at the opening meeting Thursday morning, May 6, by G. C. Lloyd, secretary, it was stated that Dr. Stead's acceptance of the office of president has given unusual satisfaction to the members. The membership of the institute, it was stated in this report, is now 2181, but owing to the high cost of publishing the proceedings, the accounts for the past year show a deficit of approximately $4000. This report also contains special mention, with an expression of regret, of the death of Andrew Carnegie.

In welcoming Dr. J. E. Stead to the chair, the retiring president, Eugene Schneider, head of the great French steelworks which bears his name, said he regarded his term of office as president of the British institute as a compliment paid to the French nation rather than to himself personally. Commenting on the difficult economic problems with which France is surrounded at present, he appealed to her allies not so much for positive aid as for assistance in creating a helpful and congenial atmosphere in which difficult tasks still lying before the French people may be discharged. A unanimous vote of thanks proposed by Sir Robert Hadfield, and seconded by Sir Arthur Cooper, was extended to Dr. Schneider.

The bessemer gold medal was presented to Harry Brearley, engineer and metallurgist, Brown Firth & Co., Sheffield, in recognition of his distinguished services to the British steel industry, including the invention of stainless steel. The medal was presented by Dr. Stead, who traced the career of the recipient from the time he was cradled in the steel trade as a cellar boy 12 years of age. Part of his duties in the casting pit at that time involved carrying beer for the chief melter, who is reported to have consumed 13 pots on a hot day. After a brief career as cellar boy, Mr. Brearley transferred his activities to the laboratory and it is in this branch of the steel industry that he has since gained such distinction.

Following the presentation of the

bessemer medal, Dr. Stead delivered his presidential address—a masterly review of iron and steelmaking progress during the past half century. In introducing the subject, Dr. Stead said, "As it is 50 years since I first entered a metallurgical establishment to act in the capacity of analyst, this may be regarded as my jubilee year. It appeared to me that having been connected with metallurgy for half a century a condensed review of the progress made during that period in the various industries would be appropriate. Having put my hand to the plow I soon found I had undertaken a task which could only be regarded as herculean. I have had more trouble in condensing than in collecting the voluminous data at my disposal. I have divided my subject into a series of sections including the following: The blast furnace; the puddling process; the foundry—science in; the basic bessemer and basic open-hearth processes; the electric furnace; the production of sound ingots; and the recognition of science."

It is probably not too much to say that Dr. Stead's address constitutes one of the most masterly historical reviews of iron and steel progress which has been made public in recent years. His 13 recommendations regarding blast furnace practice are given on one of the accompanying pages.

The opening session was concluded by a paper entitled "Iron Portland Cement," by Edmund H. Lewis, Wishaw. It was apparent from the discussion of this paper that there is still some prejudice among British engineers against the use of cement made from blast furnace slag and several speakers cited examples of the durability of this kind of cement.

Thursday afternoon was given over largely to the presentation and discussion of a series of papers on blast furnace practice, including the following: "British Blast Furnace Practice," by Fred Clements, Park Gate Iron & Steel Co., Rotherham, near Sheffield; "The Valuation of Ores and Ironmaking Material," by C. H. Ridsdale, engineer, Middlesborough; and "Chemical and Thermo Conditions in Blast Furnace Practice," by H. E. Wright, Sir B. Samuelson & Co., Ltd., Middlesborough. The papers by Messrs. Ridsdale and Clements attracted a large amount of attention, the latter being virtually a treatise on British blast furnace practice, supported by extensive tabulated data of an exceeding interesting character covering details of British furnace operations. This paper, which is published elsewhere in this issue, will be published in an early issue of THE IRON TRADE REVIEW, also presents a design for an up-to-date British furnace of 250 tons daily capacity with an ore burden containing 30 per cent iron. This furnace has a bosh diameter of 23 feet, a hearth diameter of 18 feet 9 inches and a throat diameter of 18 feet, the height being 80 feet. Mr. Ridsdale pointed out that British and Spanish ores should be purchased on a more standardized basis. He submitted a number of sample balance sheets showing how the different characteristics of the ores may be evaluated.

Another exceedingly important paper was presented at the Friday morning session by C. A. Ablett, Barrs & Ablett, 6 South square, Grays Inn, London, in which the advantages and disadvantages of direct current, compared with 3-phase alternating current for driving steel works equipment is discussed. Contrary to the practice advocated by an appreciable proportion of American engineers, Mr. Ablett believes in the almost universal employment of direct current motors for steel works operations. He bases his argument on the belief that 3-phase motors are not capable of speed variation without considerable loss of power, unless they are of a complicated and very costly type. In the case of a direct current motor, he contends the speed can easily be regulated through very wide ranges by a shunt regulator in the motor field without entailing any loss of power and also as the speed of the motor is reduced the turning moment increases, so that the maximum torque is available when it is required for rolling the heaviest sections at slow speeds. The direct-current motor, Mr. Ablett stated, possesses a further advantage in that its speed remains at about the basis speed corresponding with the setting of the shunt regulator, so that the mill does not run up to high speeds when the bar is out of the rolls. He also stated he believes there is foundation for the statement that sheet mills can be more cheaply driven by steam than by electricity.

In further discussion of this paper, F. Percy Clarke, Cargo Fleet Iron Works, Middlesborough, said he could confirm most of the conclusions of Mr. Ablett. He cited an instance where, he said, 20-horsepower direct-current motor on a table drive did the work of a 40-horsepower 3-phase motor. He said he believes that eventually there will be very little alternating current used in modern steel works. He also stated he agreed with opinions previously expressed regarding the unwisdom of linking up steelworks with central station companies, although in this respect conditions peculiar to Great Britain resulting from the electricity supply act recently passed by parliament are involved.

Walter Dixon, engineer, 38 Bath street, Glasgow, deprecated the lack of real technical training and experience along electrical lines found among engineers in British steelworks. He intimated there are too many men in such plants occupying responsible positions, who seem to think they are electrical engineers simply because they can "put two or three wires together and make the wheels go round."

Henry Crowe, Skinningrove Iron Works, Saltburn-by-the-Sea, pointed out the advantages of coupling up works possessing blast furnace energy with those having rolling mills needing power. We expressed agreement with the consensus of opinion favoring direct current for mill drives, and mentioned a hot-saw drive which required a 60-horsepower alternating current motor in place of a direct current motor of only 40 horsepower. Referring to the difficulty of transmitting direct current economically for long distances, Lieut. Col. Denys Selby-Bigge, Glasgow, called attention to the possibilities of the high-tension direct current system which has been proved successful, he said, in Spanish

Control Threatened

THE only speaker at the annual dinner of the British Iron and Steel institute, London, May 6, was Sir Robert Horne, president of the board of trade. He said that he is constantly being importuned to replace wartime control on the British iron and steel industry, not only to allocate the production but also to greatly restrict or entirely prohibit exports. The casting manufacturers, he intimated, are specially anxious to have exports of pig iron prohibited. "I hope, however," he said, "that the pig iron makers of this country will continue to conduct their business from the standpoint of good citizenship and not allow the predicament of the home consumers to become so bad as to make government control inevitable." In conclusion, he pointed out how during the war England had increased her steelmaking capacity without corresponding increases in pig iron output, although he tacitly admitted that fuel shortage lies at the root of the present stringency.

iron ore mines and has also been successfully introduced in Scotland. He also stated that iron and steel works find more profitable uses for their surplus power than to sell it to central station companies. On the other hand, William F. Beardshaw, engineer, Baltic Steel Works, Sheffield, said that in Sheffield it has been found cheaper to run sheet mills with electricity purchased from a central station than to use steam power.

Corroborative remarks with reference to the greater suitability of direct current were offered by Alfred Hutchinson, director, Skinningrove Iron Works. Mr. Hutchinson also strongly advocated the extension of the practice of forming power associations among groups of steel works so as to create energy at the most economical figure. He pointed out that in the Middlesborough district there at least 50 blast furnaces and that it would be possible to generate all of the power needed by gas engines and to work out means of using it all up including the waste week-end energy, which could perhaps be absorbed by the electrolytic production of nitrates.

The following two papers on the slag question were presented: "Notes on Slag Conditions in Open-Hearth Basic Steelmaking Practice," by John W. Wilson, the Redbourn Hill Iron & Steel Co., Frodingham, Scunthorpe, England, and "The Reduction of Silicon from the Slag in the Acid Open-Hearth Process," by Bernard Yaneske, Nether Edge, Sheffield.

At the opening of Friday's sessions, G. C. Lloyd, secretary, announced that the following awards of £100 each ($400) have been made for researches under the Carnegie fund grants: To Howard J. Stagg, Halcomb Steel Co., Syracuse, N. Y., for an investigation of the brittleness in steel at blue-heat temperatures; to Robert M. Keeney, director, metallurgical research, Colorado School of Mines, Golden, Colo., for researches on carbon-uranium steels and their physical and chemical properties in relation to iron and uranium; to Francis T. Russell, Steel, Peech & Tozer, Ltd., Sheffield, for an investigation of the constitution of chromium steels; to Frank C. Thompson, University of Sheffield, for a research on surface tension effects in metals; to John Neill Greenwood, Samuel Fox & Co., Sheffield, for an investigation enabling corrections to be made of temperature measurements of molten steels using an optical pyrometer; to John A. Newton, Victoria institute, Worcester, England, for a research of the corrodability of wrought iron and steel. Mr. Newton has already received four previous grants from the Carnegie fund.

Practical Pointers on Blast Furnace Operation

ONE of the principal features of the annual meeting of the British Iron and Steel institute, which was held in London, May 6 and 7, was the masterly address of the incoming president, Dr. J. E. Stead, consulting metallurgist, Middlesborough, a Fellow of the Royal society, in which the progress of the past half century in iron and steelmaking was carefully reviewed and the pathway of scientific progress in the future indicated. Dr. Stead devoted a considerable portion of his address to a discussion of blast-furnace practice, concluding with the following thirteen recommendations:

1—*It would appear that there is no advantage in having the capacity of the blast-furnace above 30,000 cubic feet.*

2—*The working of furnaces is best controlled by having a separate blowing-engine for each furnace.*

3—*If increased output per furnace is desired this can be attained by widening the diameter of the hearth and increasing the volume of air blown in.*

4—*All the available gases should be conserved by the adoption of the double bell, or other similar system of charging the materials.*

5—*Having secured all the gases, means should be used to obtain a maximum proportion of their calorific value by freeing the gases from dust, by most carefully controlling the proportion of air for their combustion, and avoiding excessive heat being lost in the escaping gases—conditions which can be arrived at by scientific control, by the use of autographic recorders giving the carbonic acid in the burnt gases, and their temperature by suitable pyrometers.*

6—*The coke-ovens should be close to the furnaces.*

7—*The coke should be handled as little as possible after it leaves the coke-ovens so as to avoid the production of fines, and should be sufficiently hard to resist crushing.*

8—*As coke in fine condition tends to disorganise the regular working of the blast-furnace, and reduces the output of pig, the "fines" should be sieved off and either used for other purposes or briquetted (if the process of briquetting be not too costly), and the consolidated material charged into the furnace. Some establishments have regularly removed the fines and used them for calcining iron ore; and owing to the recent great deterioration of the coke and the increased proportion of fine dust, in one case it has been found necessary to remove as much as 10 per cent in order to enable the furnace to keep up its normal production.*

9—*There is sufficient evidence to show that given efficient gas engines it is advisable to use them in preference to steam engines.*

10—*It is desirable energetically to proceed to study how to recover the heat carried out of the furnaces in the slag.*

11—*Having obtained by all the available means the maximum saving in heat, and having much more gas and heat from the blast-furnaces and coke-ovens than is necessary for the requirements of the blast-furnaces, it seems probable that in the case in which coke-ovens, blast-furnaces and steelworks are grouped togethr, sufficient gas will be available to do all the heating at the steelworks without using any raw coal. Where the blastfurnaces and coke-ovens are at a distance from the steelworks the available gases might be converted into electrical energy, and the power conveyed to where it can be utilized.*

12—*Having cleaned the gases, and having by the use of common salt or otherwise obtained dry dust sufficiently high in potash to justify its extraction, the potash should be recovered.*

13—*The question of using dry-blast should, in view of the very high price of fuel, be most carefully recent coke can be effected by drying the air, it should considered, for, if anything like a saving of 15 per pay to do it.*

Heavy Railroad Order Forecast

Government Loan of $125,000,000 as Emergency Measure in Transportation Tie-up Indicates Large Order for Plates, Shapes and Bars Will be Placed Soon—Carriers Likely to Receive Preference—Working Out Priorities System

WASHINGTON, May 24.—Approval by the interstate commerce commission of a $125,000,000 loan from the revolving fund provided by the transportation act to the railroads to buy rolling stock and equipment, as part of the program to relieve the freight congestion, indicates the immediate placing of large orders for steel plates, shapes and bars.

The loan will partly cover the minimum needs of the railroads as laid before the commission. These needs include 2000 locomotives, 100,000 freight cars, 3000 passenger cars, and 1000 baggage cars, which, with other equipment, it is estimated, will require about 3,000,000 tons of steel, or practically one month's production.

While the commission may not follow fully the suggestions of the railroads as to preference and priorities, it is believed that the carriers will be given immediate bookings, and take preferred movement of steel.

Twenty-eight local freight blockade committees, designated by the commission to survey the transportation difficulties, have begun work and will forward immediately to the commission information upon which the latter will determine policies regarding priorities and embargoes. While doubt exists that the commission will establish stringent restrictions as to priorities, preference probably will be given food, fuel and clothing.

Steel shipment generally may be further delayed except those for more pressing needs, such as railroad requirements. Orders of the commission for routing cars over more available roads, and transferring rolling stock east and west have been put into effect, and are giving some signs of relief.

In the meantime the hearing regarding increased freight rates involving over $1,000,000,000 advance, began yesterday before the commission, and perhaps will last two weeks. So far the steel trade has made no representation before the commission in the case, and it is said will not do so in any organized sense, if at all. The principal protest against the increases are coming from the grain and middle west live stock interests.

How closely business and the federal government still are bound in spite of the divorce sought at the close of the war has been disclosed again by the tieup of the railroads and the various attempts to relieve it. The railroads are back under strictly private control, but their operation today is virtually under the direction of the interstate commerce commission, and at the request of the railroads themselves. Further, this direction of operations would be even more general had the commission acceded to the wishes of the roads.

When the so-called outlaw strike of switchmen first broke, the railroads individually sought to clear their terminals and gateways, but to no avail. Then, under the guidance of the American Railroad association, they aimed at collective action, but with no more tangible results. Finally, the railroad executives went to the interstate commerce commission, confessed their inability to meet the situation, and said, in effect: "We have tried to clear away this congestion and have failed. You do it for us." In fairness to the railroads it must be said that their failure apparently was due to their inability to do for themselves, because of the Sherman and Clayton acts, what the interstate commerce commission is expressly directed to do under the provisions of the Cummins-Esch transportation act. In Washington, this view is shared by all save the advocates of the Plumb plan and government ownership.

In a great many quarters in Washington the question is not of whether the railroads may be forced back to government control, but how soon? Financing of the new equipment the carriers need appears to be the least of their problems. Granting of freight rate increases commensurate with any wage award by the railroad labor board will only make the general situation all the more abnormal, it is pointed out. A great majority of observers here are of the opinion the railroads will be unable to escape another period of government control before the reconstruction period is ended. The one possible preventive, it is held, is the repeal of the Sherman and Clayton acts, and this appears to be most remote. The key to the entire railroad situation is held by the interstate commerce commission, for under the Cummins-Esch act it not only determines the emergency but is the body that will take complete control in case it decides the carriers are going under.

Interstate commerce commission members have stopped far short of complying with the requests made by railroad executives, their attitude being that they are not "rubber stamps" to do precisely as the executives wish. The commission, in seeking to unravel the traffic snarl, has been acting upon the theory that the first logical move was to clear the gateways and sidings so that food and fuel could be moved, and once it was possible to move them to issue priority orders, if necessary, to give them the right of way. The commission's attitude has been one of complete dependence on the investigations and reports of its own inspectors rather than upon the suggestions of the railroad executives and the recommendations of shippers. To say that the commission has been hostile to the railroads is exaggerating the situation, but its attitude has been one of reasserting itself, for the first time since the railroad administration subordinated it.

Trade Board Sees "Day of Reckoning"

WASHINGTON, May 25.—Iron and steel makers at present may ignore the requests of the federal trade commission for monthly business reports and suffer no greater embarrassment than the serving of default notices, but there will be a day of reckoning, at $100 a day, if the United States supreme court upholds the trade commission act. This is the warning emanating from trade commission

headquarters coincident with the statement the commission will carry to the highest court the suit it lost recently to the Maynard Coal Co., of Columbus, O.

Though the supreme court of the District of Columbia ruled that the commission lacks the authority to demand private business information of the nature it requires in its monthly statements, the commission has not turned about face. It is proceeding as though no such decision had been handed down, and will do so until the supreme court has passed upon the question, the commission says. Meanwhile, industry can do as it pleases in the matter of submitting the reports, the commission declares. Manufacturers who refuse to report will be cited by law, but no action will be taken pending a final decision. If the commission wins, then will come its day of reckoning. Just now, it asserts, it is a "take it or leave it" proposition with manufacturers.

Claim is made by the commission that it is receiving the desired reports from corporations producing about 85 per cent of the pig iron and steel of the country. Default notice has not been served upon any iron and steel interests nor upon any coal operators, who have taken the lead in questioning the authority of the commission. Default notice may be served by the commission on the refusal of any company to comply. Thirty days following the serving of this notice, the fine of $100 a day imposed by the federal trade commission act begins piling up.

The National Coal association, which backed the Maynard Coal Co. case against the commission, takes this attitude: "In advising coal operators that it is unnecessary to file reports with the federal trade commission, the National Coal association is convinced that it is acting in full accord with the agreement that the Maynard suit should be considered as a test case, and that such action by the operators will be entirely in harmony with the arrangements made with the commission prior to the institution of the test litigation. Unless the court's injunction order is reversed or set aside, it should never again be necessary for any coal mining company to file with the federal trade commission the reports of the character which it attempts to require.

Seasonal Freight Rates Plan Includes Coke

Washington, May 25.—Coke as well as coal freight rates are made variable by the provisions of the Frelinghuysen bill (S. 4278), it now develops, and passage of the bill would mean that blast furnace and foundry interests would have to reckon with eight distinct freight rates annually in figuring their costs. Though drafted primarily to force the storing of coal in off-seasons, the amended bill states that the term "coal" includes "anthracite and bituminous coal, lignite, coke, including petroleum coke, and briquettes and boulets made from anthracite and bituminous coal and from coke."

The bill has been amended and favorably acted upon by a subcommittee of the senate interstate commerce committee, and approval by the entire committee some time this week appears probable. Chances of its passage before the June recess are held to be slight, but if congress is in session through July and August it is believed the bill has better than an even chance of being enacted. In this case it would be effective Sept. 1, and at once result in a 15 cent advance.

The Freylinghuysen bill provides that in six months of the year coal and coke freight rates shall be stated sums above the base, while in the remaining six months the rates would be stated sums below the base. From Feb. 1 to July 31 the rates would be increased above their present levels; from Aug. 1 to Jan. 31 they would be depressed. At no time in the year would the base rate actually apply. Specifically, these increases and decreases would be:

August.—Five cents a ton above the base; September, 15 cents above; October, November and December, 25 cents above; January, 10 cents above; February, 10 cents below the base; March, April and May, 25 cents below; June, 15 cents below; and July, 5 cents below.

Prompting the measure, declares Senator Frelinghuysen, is the desire to make it worth while financially for fuel users to lay in their winter stocks in the period from Feb. 1 to July 31, when demand upon the mines is lightest. Opponents say they will be unable to lay in more than 30 days' stock because of the high cost of storage, and the increased rates in the Aug. 1-Jan. 31 period will more than offset the decrease in the other half year because consumption is heavier in the former period.

The proposed freight rate advances, scheduled to take effect Sept. 1 if granted by the interstate commerce commission, would not disturb the sliding scale, for they would be operative in accordance with it.

More Delay

For Refractories Shipments Seen in New Car Order

Pittsburgh, May 25.—Deliveries of refractories against both sales and contracts still are much restricted by the railroad transportation situation and while conditions so far as freight movements are concerned are somewhat easier than they have been, manufacturers fear that the recent order of the Interstate Commerce commission is going to make matters worse for them. This order calls for the sending of thousands of box cars into the west for the movement of grain, and it is said this cannot fail to affect shipments of blast furnace and steel plant brick, which cannot be safely shipped in open top cars.

Plant operations remain irregular, varying with the success which the different manufacturers have had in making shipments and also as to the amount of storage space. In some districts, sheds are filled to capacity and the desire to avoid the extra expense of piling also is finding reflection in curtailed production. Generally, however, manufacturers are disposed to keep running as fully as possible and to store production, as it is believed some big holes are being created in iron and steel plant stocks, which will have to be filled up later. Current demands are numerous and a satisfactory business might be in progress if shipments could be made in normal fashion. Prices are firm at the recent levels.

Refractories

(Per 1000 f.o.b. works)

FIRE CLAY BRICK
(First Quality)

Pennsylvania	$45.00 to 51.00
Ohio	42.00 to 50.00
Kentucky	42.00 to 50.00
Illinois-Missouri	45.00 to 50.00

FIRE CLAY BRICK
(Second Quality)

Pennsylvania	$35.00 to 40.00
Ohio	30.00 to 35.00
Illinois-Missouri	35.00 to 40.00

SILICA BRICK

Pennsylvania	$50.00 to 55.00
Chicago	55.00 to 60.00
Birmingham	51.00 to 56.00

MAGNESITE BRICK
(Per Net Ton)

9 x 4½ x 2½	$90.00 to 100.00

CHROME BRICK
(Per Net Ton)

9 x 4½ x 2½	$85.00 to 95.00

BAUXITE BRICK
(Per Net Ton)

55 per cent	$40.00 to 45.00
70 per cent	100.00 base

Hardware Men Are Optimistic

Cleveland Meeting of Metal Section of National Hardware Association of United States Reflects Promising Business Outlook—Speaker Says Continued Demand for Sheet Metal Products Is Assured

GENERAL optimism as to the outlook of the metal business for the balance of 1920, in spite of curtailed production and more rigid credit requirements was shown at the ninth annual meeting of the metal branch of the National Hardware Association of the United States, held at the Hotel Cleveland, Cleveland, May 21 and 22. With more than 125 members registered, this meeting was the largest ever held by the association. In absence of the president of the organization, the chairman of the metal committee, W. H. Donlevy, Carter, Donlevy & Co., Philadelphia, presided and in his opening remarks spoke of the peculiar situation in which the metal industry finds itself today due to the recent steel strike, coal strike, the present railroad strike and the over-inflation of the financial markets.

At the opening session on Friday morning in a paper discussing "Production and Demand for the Balance of 1920," F. M. Fuller, American Sheet & Tin Plate Co., Pittsburgh, said:

"The factors which influence production and demand are now susceptible to such rapid changes that it seems inadvisable to consider this subject except in a general way. It is unfortunate that present chaotic conditions prevent us from making an accurate forecast, but it now appears that mill operations will be governed entirely in the next few months, at least, by transportation facilities. Labor trouble has been breaking out in new places from time to time and it is almost impossible for a manufacturer to forecast with any degree of certainty the extent of operations on the following day, much less the next week or month.

Car Situation Serious

"The condition with respect to box cars is equally serious. Thousands of these which were ordered west by the railroad administration for the movement of grain have never been returned. To make matters worse, a ruling made by the administration prevented us from loading these cars and hundreds went west empty.

"Furthermore, thousands of box cars are in need of repair and many are utterly unfit for use, especially in the movement of sheets and tin plate. During the past six months highly finished sheets have been shipped in open top cars and tin plate in large quantities has been transported in cattle cars. During the past four or five years the supply of cars has increased only about 2 per cent, whereas the volume of freight increased nearly 50 per cent.

"Considering for a moment the question of demand, some concern is justifiable regarding the wheat and other crops. Late reports from some lines of industry indicate a slight cessation in the demand for finished goods. It is likewise stated that collections are not up to the standard of recent months. There is also a disposition, more or less wide spread, to reduce stocks by making substantial reductions in retail prices. Generally speaking, the peak of public buying in many lines has probably been reached or passed, but we have observed no indications to this effect in the sheet and tin plate business. The inability of sheet and tin plate manufacturers, owing to various causes, to meet their contractural obligations has resulted in a large volume of unfilled tonnage while the warehouses of many jobbers and consumers are almost, if not entirely, empty. Notwithstanding the number of disturbing elements, however, which undoubtedly exist in some lines, the great scarcity of steel in various forms, both here and abroad, will, in our opinion, provide sufficient demand for sheets and tin plate through both jobbers and manufacturers to warrant an optimistic outlook for the balance of 1920."

In a paper on the same subject, J. B. Roberts, Youngstown Sheet & Tube Co., Youngstown, O., said:

"During all this time that the operations of the mills have been so seriously curtailed, there has been a strong and pressing demand for steel products. The tonnage on the mills' books has of necessity been carried forward from month to month and deliveries are so much in arrears that it seems unlikely that there will be very much tonnage available during the balance of this year, over and above that already booked, except that some relief from the shortage of sheets and tin plates may perhaps be afforded by the new mills that have recently been started or those that will be completed during the year. The jobbers have been able to obtain only a fraction of their requirements and what material they have received has scarcely touched their floors, so great has been the need of it for building operations; consequently their warehouses are practically bare of stocks. While perhaps there has been some slackening in the volume of new construction on account of the money situation, no doubt the steel represented by orders now in hand is required for projects already financed and in the course of construction.

"In view of these conditions, it seems to me that the demand for the remainder of this year is assured and I am only fearful that we shall not be able to produce enough material to come anywhere near satisfying the requirements of our trade. I have left out of consideration the foreign demand which is very active.

"The resulting shortage of fuel and raw materials and inability to obtain transportation for finished products will so restrict operations that I shall be agreeably surprised if steel is produced to the extent of 75 per cent of normal capacity during the balance of this year."

Discussion following the presenting of the two papers brought out the fact that the canning material situation is very serious and that tin plate mills, which are already running lower than other mills, are concentrating on tin plate for cans. No production is being lost on account of the labor situation although there is a shortage of common labor and probably would be a shortage of all labor were the mills able to run 100 per cent. Labor turnover is great.

Defines a Jobber

In defining the "Proper Function of the Jobber," John N. Remsen, Stark Rolling Mill Co., Canton, O., presented a paper, part of which is as follows:

"Every jobber should be a distributer, or he is not entitled to be classed as a jobber. The term "jobber" has been defined as a concern who has salesmen canvassing the retail trade in and outside of his home city, and carries material in stock in sufficient quantity to make prompt delivery and properly supply the trade tributary to the point in which the jobber is located.

"It is unquestionable that it is no part of the jobbers' function to act as a broker. I have never been able to conceive of a business opinion to the effect that it is profitable for a jobber to sell sheets by the carload for mill delivery at the profit, or what might be properly stated lack of profit, to be secured by such transactions, in normal times. I hasten to state that I am equally unable to conceive of any state of mind on the part of any rolling mill that would lead them to believe it is any part of their function to sell to any class of trade in less than carloads lots.

"Unquestionably the mills have been guilty of improper practices and the jobbers have been guilty of an ill-advised policy. It is not necessary to have concerted action to accomplish an obviously necessary reform. The jobbers have recently taken a step in the right direction, as evidenced in a letter by our secretary dated March 16. In that letter he

suggests that all mill shipments of less than 25 bundles be eliminated and that a quantity differential be charged for less than carload shipments. He ends this very good letter, however, by the statement: 'We therefore are quite confident, that the suggestions of our committee will at once be placed in effect by the various manufacturers.'"

H. E. Nickerson, Congdon & Carpenter Co., Providence, R. I., discussed a paper on "The Service Performed by the Jobber as Warehouses for the Mills," and by reading several letters from large manufacturers showed that the jobber was greatly depended upon for supplies of materials. In an address "Should Not Mills Give More Consideration to Their Regular Old Established Distributors Than to Speculators?" F. O. Schoedinger, F. O. Schoedinger, Columbus, O., stated that this was a matter of viewpoint. Each mill has a different method of doing business and the methods of some mills are not to be commended. These conditions will right themselves, however, if the statements of President Farrell, United States Steel Corp., is true that mill additions have been made so rapidly that the steel manufacturers must seek world markets instead of domestic markets to dispose of their products.

A paper, "The Expense of the Distributor in Handling Warehouse Business as Compared to Direct Mill Shipments," by M. M. Riter, Riter Bros. & Co., Philadelphia, showed that including sales expense warehousing costs amount to about 20 per cent of the original cost of the material. Discussion on the subject showed that in 1919 the cost of placing material in the warehouse was about $2 per ton, holding it about $1 and moving it out of the warehouse about $2 per ton, making a total cost of about $5 per ton.

Limiting of Sizes Desirable

At the afternoon session some consideration was given to the standardizing of sizes and styles of sheets. Although the numbers of sizes has been pretty well limited because of the shortage of material to carry full lines, it seemed advisable from the warehousing point of view to permanently discontinue some sizes. The report of the insurance classification committee showed that the committee had been totally unable to make arrangements with the fire insurance underwriters for testing tin roofing for its fire protection properties.

A short address by John A. Penton, president Penton Publishing Co., Cleveland, on the "General Iron and Steel Situation," was delivered Saturday morning, which session was presided over by Fred L. Greely, The Herrick Co., Boston. Mr. Penton said that the iron and steel business is in a radically different position than other basic industries. With coal mining and transportation tied up, the lack of fuel during the coming winter will cause considerable suffering and will regulate the capacity at which industry can operate. Production of iron and steel during 1920 will probably equal the output of 1919 but will fall far below the record of 1916. Consumption of iron and steel will be healthy and will show less strain than other lines although considerable difficulty will be shown in getting money. Conservative credits will be necessary. The financial situation will readjust itself in time, continued Mr. Penton, and without a panic, although new credit arrangements and discounting of notes will be accomplished with difficulty. In conclusion he stated that prices of raw and semifinished materials would not recede during the coming year but that some reductions in finished materials may be expected.

Election of the new metal committee of the association was as follows: To serve for three years, W. H. Donlevy, Carter, Donlevy & Co., Philadelphia; J. George Fuchs, Bruce & Cook, New York; Edgar Lyon, Lyon, Conklin & Co., Inc., Baltimore; Harry L. Doten, Austin & Doten, Boston; F. M. Fuller, American Sheet & Tin Plate Co., Pittsburgh; W. H. Abbott, Whitaker Glessner Co., Wheeling, W. Va.; Ernest T. Weir, Weirton Steel Co., Weirton, Va. To serve for two years, Fred L. Greely, The Herrick Co., Boston; F. O. Schoedinger, F. O. Schoedinger, Columbus, O.; Clifford E. Pierce, Betz-Pierce Co., Cleveland; F. J. McNeive, W. F. Potts Sons & Co., Philadelphia; John Follansbee, Follansbee Bros. Co., Pittsburgh; H. D. Westfall, La Belle Iron Works, Steubenville, O.; Louis Follet, Standard Tin Plate Co., Canonsburg, Pa. To serve for one year, E. T. Sproull, Trumbull Steel Co., Warren, O.; G. T. Thomas, Canton Sheet Steel Co., Canton, O.; G. H. Jones, Inland Steel Co., Chicago; William E Manning, Youngstown Sheet & Tube Co., Youngstown, O.; F. B. Platt, Farwell, Oymun, Kirk & Co., St. Paul, Minn.; H. B. Thompson, Conklin Tin Plate & Metal Co., Atlanta, Ga.; F. A. Wilkning, Standard Metal Co., Indianapolis.

Just before adjournment of the session Saturday noon, it was almost unanimously decided to return to Cleveland for the meeting of the metal branch next year. This action was taken as result of the large attendance at this year's meeting.

Steel Club

Of Philadelphia Holds Formal Dinner —Economic Situation Discussed

The Steel Club of Philadelphia held its second formal dinner at the Ritz-Carlton hotel, that city, May 18, with about 150 participating. Practically the entire membership, comprising the Philadelphia district sales managers of the various steel companies was on hand, accompanied by guests. The speakers included Charles Coolidge Parlin, manager of the division of commercial research, Curtis Publishing Co., Philadelphia, and E. J. Cattell, Philadelphia city statistician. Mr. Parlin reviewed in detail the factors having a bearing upon the present and future economic condition and he concluded that all economic factors now are sound and that indications point to continued prosperity. He considered that the tight money situation during the spring has been a blessing in disguise, since it served to direct the attention of business men and the public to the need for care in the use of money. He expressed his confidence in the ability of our flexible banking system to take care of such demands as we will have over the remainder of the year, including even the big autumn demand for money. Mr. Parlin spoke of the immense increase in the buying power of the farmers of the country. He said the value of farm property has increased more in each of the last two decades than in all the previous history of the country and that there now is more money invested in farm property than in all of the manufacturing and transportation properties of the country. Mr. Parlin said that the farmers' buying power will not be impaired in the future as prices of farm products will never go back to prewar levels.

Mr. Parlin pointed out the necessity for maintaining an optimistic attitude.

Mr. Parlin exhibited a chart illustrating the tendency toward the concentration of manufacturing in the hands of the most efficient. During the past couple of decades, the chart showed, the number of companies in the various industries have grown fewer in number; instead of a great many small companies, there has been a tendency toward a smaller number of individual interests, having, however, greatly increased capitalization.

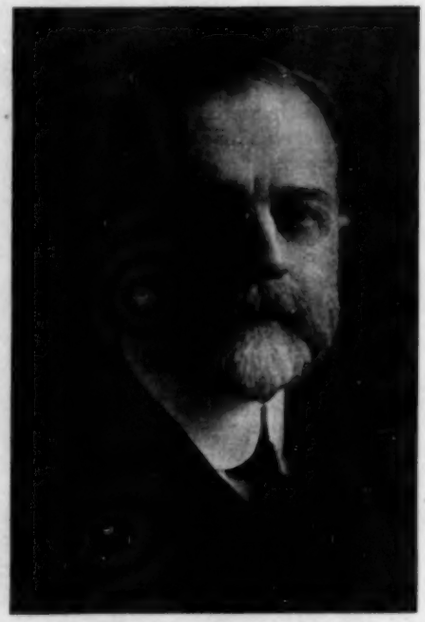
Mr. Cattell, who made a very entertaining address, expressed his belief that by thrift and stimulation of production the huge war expenditures were offset and that the nation concluded the war no poorer than before. Mr. Cattell's address was followed by a moving picture show.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

GEN. HORACE L. HALDEMAN'S retirement from the presidency of the Pulaski Iron Co., May 10, marks the rounding out of an active career of nearly half a century in the pig iron producing industry. Born in 1847 at Locust Grove, Lancaster county, Pa., General Haldeman came of a distinguished colonial family which was among the most important landholders in Pennsylvania and whose sons distinguished themselves in the various wars of the United States. After being at the front in the early portion of the Civil war under his father, who served as assistant adjutant general, General Haldeman, although not quite 16 years of age, recruited more than half of a company and was commissioned a first lieutenant, Twentieth regiment, Pennsylvania cavalry. At the close of the war he was mustered out with the rank of captain. The records of a prominent military order show him to have been one of the youngest, if not the youngest, commissioned officer during the Civil war.

Following the war, General Haldeman spent two years in the insurance business, and then spent some years in the passenger department of the Pennsylvania railroad, after which he became identified with the blast furnace industry which had been established by his grandfather at Chickies, Pa. He entered the business at Chickies in 1872 as a member of E. Haldeman & Co., which was succeeded by the Chickies Iron Co., and later by Haldeman, Grubb & Co. As managing partner in the latter company, General Haldeman had under his personal management three blast furnaces and nine iron ore mines. In 1898 he disposed of his Chickies interests and became vice president of the Pulaski Iron Co., of which he later was made president. It was under his management that the Pulaski interest adopted the policy of expansion which led to the acquisition of the company's present extensive iron ore and coal holdings and to the modernizing of the blast furnace at Pulaski. General Haldeman long was associated with the national guard of Pennsylvania as commissary general, and retired recently with the rank of brigadier general. He served as colonel on the staffs of four governors of Pennsylvania. General Haldeman is a member of the Pennsylvania state legislature. He is a member of 18 technical, historical and patriotic associations, including



GEN. HORACE L. HALDEMAN

the American Foundrymen's association, the Philadelphia Foundrymen's association, the American Society for Testing Materials, Franklin institute of Philadelphia, and others.

J. L. Harrison has been placed in charge of the Chicago office, established in the Peoples Gas building by the Newton Steel Co., Neton Falls, O.

Francis Juraschek has been placed in charge of the technical department of Hanff-Metzger, Inc., advertising agents, New York.

Hillis F. Hackedorn has been appointed manager of the Detroit offices, in the Penobscot building, of the H. H. Robertson Co., Pittsburgh, formerly the Asbestos Protected Metal Co.

Irvin V. Shaw, formerly in charge of the DuBois office of Reed, Fears & Miller, has been appointed sales manager for Charles W. Rodgers & Co., with offices at DuBois, Pa. He assumes his new duties immediately.

Carl G. Broehm, formerly foundry superintendent of the Michigan Lubricator Co., Detroit, manufacturer of brass goods, now is secretary of the LeRoy Broehm Foundry Co., 932 Jefferson avenue east, that city.

Carl Aichberger has resigned as secretary and sales manager of the Sandusky Foundry & Machine Co., Sandusky, O., and is now connected with the Fitzpatrick Products Corp., 99 John street, New York in an executive capacity.

V. W. Tarnay, formerly chief engineer and manager of structural sales department of the Porcupine Co., and previous to that chief engineer for the Lackawanna Bridge Co., Buffalo, has opened an engineering office in Bridgeport, Conn.

J. H. Rowland has been appointed manager of the New York office of the Phoenix Bridge Co. and the Phoenix Iron Co., succeeding the late D. W. Sisson. The New York office of these companies has been removed to 132 Nassau street.

The Institution of British Foundrymen has been granted a royal charter which it is hoped will be completed in time for the meeting in August. The steady growth of the society continues and the membership is now nearing the 2000 mark.

Thomas Towne, first vice president and general manager of the Federal Tool & Alloy Steel Corp., New York, Brooklyn, Cleveland, Chicago and New Orleans, whose illness since the first of the year terminated in a major operation, has left the hospital and is convalescing steadily.

J. G. Hershey, 2336 Oliver building, Pittsburgh, has been appointed purchasing agent for the Mississippi Valley Trading & Navigation Co., Equitable building, St. Louis. This organization is engaged in foreign tarde, specializing in serving the industries located in the Mississippi valley on import and export business. Mr. Hershey remains in Pittsburgh, giving his attention to the purchase of iron and steel products on orders of his company.

Men of the Machinery Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

DEWITT V. D. REILLEY, formerly vice president of the Davis-Bournonville Co., Jersey City, N. J., was elected president of that company at a recent directors' meeting. He succeeds Augustine Davis, who resigned last November. Charles B. Wortham, treasurer of the company since its organization, was elected vice president, and William G. McCune, secretary and treasurer. The board of directors consists of Messrs. Reiley, Wortham, McCune, Davis, Charles J. Mayer, Daniel E. Evarts and H. Rowntree.

Charles R. Blake of the Mason Machine Works, Taunton, Mass., has sailed for China on a business mission.

Robert B. Soderberg, Hartford Conn., has been appointed industrial sales manager for the Hartford district of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

W. R. McDonough & Co., Citizens building, Cleveland, is sales representative for the Ward Tool & Forging Co., Latrobe, Pa., in the Cleveland district.

Charles E. Duncan has resigned from the Mesta Machine Co., Pittsburgh, to become general superintendent of the Algoma Steel Co., Sault Ste. Marie, Ont.

Louis E. Press, formerly with the Lees, Brainer Co., Cleveland, in an important capacity, now is affiliated with the sales department of the Strong, Carlisle & Hammond Co., that city.

F. F. Beall has resigned as vice president in charge of manufacturing of the Packard Motor Car Co., Detroit, and has been succeeded by E. F. Roberts. Mr. Beall has been elected president of the Gray Motor Co., Detroit.

E. G. Bauer who has been manager at Dayton, O., for the Biggs-Watterson Co., Cleveland, has been appointed district sales manager, with headquarters at Toledo, O. The change is to go into effect immediately.

C. A. Croteau of the Wood Hydraulic Hoist & Body Co., Detroit, has been appointed superintendent of the Cedar avenue branch of the Truck Engineering Co., Cleveland, manufacturer and jobber of bodies, hoists, power winches, etc. Paul Schweisgood, recently with the Goodrich Tire & Rubber Co., has been appointed sales engineer for Akron, Canton, Mansfield and Youngstown, O., for the Truck Engineering Co.

Robert W. McCleary, formerly connected with the rolls department of the Mesta Machine Co., Pittsburgh, recently resigned to become manager of the Massachusetts Iron & Steel Co., Danvers, Mass.

J. L. Edwards, with headquarters at 498 Union Arcade building, Pittsburgh, now represents the Mahr Mfg. Co., Minneapolis, oil burning equipment, in western Pennsylvania. He succeeds J. S. Longnecker.

N. N. Baad, who formerly had charge of the heat treating department of the De La Vergne Machine Co., New York, has resigned to becomes a sales and service engineer with the F. A. Canhoun Co., 76 Montgomery street, Jersey City, N. J.

R. L. Bruck and S. B. Williams now are affiliated with the sales force of the Cleveland Duplex Machinery Co., 1224 West Sixth street, Cleveland, covering Cleveland territory. Mr. Bruck formerly was in business for himself as a designer and doing patent office attorney work.

E. G. Lewis, who has been manager of the Cleveland office, established in September, 1919, by the Bucyrus Co., South Milwaukee, Wis., has been appointed central sales manager of the company. His headquarters will be 622 McCormick building, Chicago, and he will continue to supervise the Cleveland office. He succeeds E. C. Hingston, resigned.

S. deB. Keim has resigned from the Locomobile Co., Bridgeport, Conn., to accept the position of sales manager of the American Works, Springfield, Mass., of the Rolls-Royce, Ltd. Mr. Keim's new connection comes at the end of 20 years' association with the Locomobile company at Bridgeport, as manager of the Philadelphia branch and for the last four years as manager of the New York branch.

Gifford K. Simonds, general manager of the Simonds Mfg. Co., Fitchburg, Mass., has been elected president of the Fitchburg Housing Corp., which has been organized by manufacturers with $100,000 capital to build homes for workmen in that city. The plan was inaugurated by Mr. Simonds.

G. L. Bohannon has been placed in charge of the recently established eastern office of the Thomas Spacing Machine Co., Fulton building, Pittsburgh, successor to the Standard Bridge Tool Co. His headquarters will be at 57 Transportation building, Philadelphia, and he will handle the company's entire line of spacing tables, multiple punches, punches and shears, angle planers, bevelers and bending rolls, open back inclinable presses, as well as a complete line of small tools. Mr. Bohannon formerly was chief engineer and assistant general manager of the Youngstown Steel Car Co.

B. G. Tarkington formerly industrial heating engineer with Hodenpyl-Hardy Co., Jackson, Mich., has been placed in charge of district sales for the Booth Electric Furnace Co., 326 West Madison street, Chicago. D. E. Carpenter, formerly of the Detroit office of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been placed in charge of sales in Cincinnati territory. Headquarters are at the Buckeye Products Co., 919 West Fifth street, Cincinnati. Bartholomew Bannon, 321 Pitt street, Sydney, Australia, will manage the foreign office recently opened for Australasia by the Booth Electric Furnace Co.

Charles C. Phelps recently became associated with the Uehling Instrument Co., 71 Broadway, New York, combustion engineer and manufacturer of carbon dioxide recording equipment and other fuel economy apparatus. He is devoting attention to research in connection with efficient combustion of fuel oil in boiler furnaces. He graduated from the Stevens Institute of Technology and has spent several years studying power plant problems. For five years he was associated with the Ingersoll-Rand Co., manufacturer of power plant equipment and pneumatic machinery.

Indications Point to Deflation

Banking Authorities in Conference at Washington Make Momentous Decision for Contraction of Extended Credit Structure—Speculative Loans Disapproved—Liquidation Is in Evidence—General Financial News

BY JOHN W. HILL, FINANCIAL EDITOR

A CATALOG of the most outstanding developments of far-reaching significance which have been crowded into the brief space of recent days, would include the following:

The decision of the federal reserve board to adopt stricter measures to contract credit and curtail nonessential and speculative loans.

The wave of retail price cutting which has swept the country and which has given evidence of working back to the wholesaler and manufacturer.

A slight improvement in the federal reserve system's reservation to 42.7 per cent from the low record point of 42.2 reached the previous week.

The announcement of a slump of $135,000,000 in April exports against a fall of only $30,000,000 in imports, indicating a lessening of the excess of exports.

The adoption of energetic measures by the interstate commerce commission to relieve the traffic blockade.

At its conference with its advisory board and directors of the 12 regional banks in Washington last week the federal reserve board outlined a plan for more drastic control of credit resources than had yet been attempted.

Last November when the board saw that inflation was progressing too rapidly for the country's good, a policy of increased rediscount rates was put into effect. The results, however, extended no further than a consequent liquidation of the securities markets, the business community absorbing the higher rates in selling prices which were passed along to eager buyers. Weeks ago it became apparent that instead of growing better the reserve position of the federal reserve system was becoming critical and required urgent treatment before the immense strain of the crop movement demands was felt. The easing of the situation was retarded in large part by the railroad strike which has tied up vast sums of loans in unbalanced inventories and in finished products that cannot be moved.

The efforts of the interstate commerce commission to start movements of freight are expected to bring relief to the industrial and credit situations and to permit production to proceed and liquidation of credits and inflated prices to work out gradually and orderly.

In their decision to curtail credits the leading bankers of the country are merely carrying forward a practice that has been an influence in the general situation for some weeks. The fundamental financial and business situation is regarded as sound and if care and caution are exercised by bankers, manufacturers and business men of all kinds in the next few months the deflation which is necessary will be carried out without any suffering, in the opinion of high financial authorities. All agree that the ceaseless cycle of pyramiding prices and wages cannot go on indefinitely. The improvement of the federal reserve ratio is regarded as reflecting the liquidation that has already been set in motion.

Criticisms Are False

The price cutting which has centered the attention of the country has aroused much skeptical criticism among those who point out that it is merely a hysteria which soon will come to an end as most retailers will have to replace their goods sold at a higher price than ever. All indications point to the fallacy of such a criticism. The central fact must not be forgotten that the retailers did not reduce prices out of any altruistic spirit but because the public refused to pay the high prices asked for goods, causing a large accumulation of unsold goods on the shelves of retailers. The public for months had been fed with the propaganda of high prices and still higher prices and now that it has been seen that the sacred cow of high prices has been cast down it is doubtful if the public would submit again to extortion. This is the feeling of most business men and of bankers who are urging caution and orderly submission to the trend of the times, if a serious crash is to be avoided. This trend is toward readjustment from the feverish activity of past months to a more normal and healthy level of business and prices.

Of great importance was the record of April foreign trade which showed that although prices in this country have increased about 26 per cent since April, 1919, exports in value actually declined 5 per cent compared with last year. On the other hand, imports increased 82 per cent over April of 1919, a development doubly significant when it is remembered that foreign exchanges have fallen from 30 to 70 per cent under one year ago and that import valuations are computed on the basis of current exchange rates of the country from which the goods come.

Implement Makers Ask Credit Preference

(*Staff Correspondence*)

Washington, May 25.—Preference for rediscount at federal reserve banks of farm implement notes was asked by makers of agricultural machinery at a recent conference here with members of the federal reserve board and officials of the office of farm management, department of agriculture. The preference was requested on the ground that it is necessary that the farmers get their implements for the harvesting of crops and was looked upon as an aid for implement makers to obtain shipments of steel. There are no prospects that the request will be granted. Representatives of other producing interests, including automobiles makers, also came to Washington because they were apprehensive lest the meeting held here recently of Class A directors of the federal reserve banks, the federal reserve board and the federal reserve advisory council would establish certain lines as essential and nonessential for the purpose of granting credits to the former and denying them to the latter.

It is officially announced, however, that the board and the banks will make no general rules. The producers were informed that no industry can be exempted from any policy adopted. The board told the bankers that they must determine each loan on its merits and decline to advance money for nonessential purposes. At the same time it is the purpose of the board and the government generally to avoid a return to any wartime policy insofar as possible.

The result of the meeting, it is said, may be far reaching in its effect on slowing down production in socalled nonessential lines and there has been some question as to what it may mean in lessening the output of pleasure cars and what this in turn may mean with

relation to holding up shipments of steel they require, especially sheets, and the diversion of this steel to other sources or the holding up of steel mill bookings for automobile pleasure car production. Efforts of the interstate commerce commission to obtain equipment in the way of cars, locomotives and other requirements of railroads have a direct bearing on the entire situation and it is stated that preference of steel production for this purpose may be urged. In the matter of credit, however, this is provided for through the revolving fund of the transportation act, of which it is proposed to expend $125,000,000 for railroad equipment.

First Otis Steel Report Since Purchase Out

The first annual report of the Otis Steel Co., following the purchase of the property by American capitalists from British owners and the acquisition of the Cleveland Furnace Co., last year, shows a balance available for dividends on common stock of $992,962. Net sales for the year amounted to $16,285,329, producing a net income of $1,556,084 after deduction of selling costs, administrative and general expenses, and losses resulting from the steel strike.

Total income is given as $1,691,798, from which $610,758 was deducted for depreciation and $88,178 for federal taxes, leaving a net profit of $992,868.

Net earnings for the first three months of 1920, were $1,089,118 before federal taxes, or $820,389 after depreciation and other charges, which is equivalent to an annual rate in excess of $5.60 a share. The Otis Steel Co. has outstanding or presently to be issued $9,830,600 of 7 per cent preferred stock. The entire amount of this stock was considered as being outstanding in estimating available net earnings for the common from the results of 1920 first quarter operations.

The company's condensed balance sheet as of Dec. 31, 1919, shows cash assets of $593,754, Liberty bonds $449,481, other securities $139,162, trade acceptances $23,175, accounts receivable $1,874,220, advances on ore contracts $97,097, merchandise inventory $6,425,968, other assets $733,950, reserve funds $5061, preferred stock dividend fund $84,536, land, buildings, machinery, etc. $13,632,611, deferred charges $567,344, total $24,626,359.

Liabilities include notes payable $1,750,000, accounts payable $2,239,588, accrued taxes, interest, etc. $260,329, reserves including federal taxes $6,460,194, preferred stock 7 per cent cumulative $4,830,600, common stock (no par value) 411,668 shares issued at a declared value of $5 each $2,058,340, surplus $7,027,308, total $24,626,359.

1919 Profits of Cambria Steel Decline

Net earnings after charge and federal taxes of $4,175,664 are shown by the annual report of the Cambria Steel Co., for the year ended Dec. 31. In 1918 the net amounted to $7,567,535. The balance transferred to the company's profit and loss surplus, after payment of dividends, amounted to $125,664, making the total surplus at the close of the year $67,816,956. Net income for 1917 was $25,721,853 of which $20,321,853 was carried to surplus. The comparative income account follows:

	1919	1918	1917
Net earnings..	*$6,646,806	$16,691,462	$47,121,669
Dep., etc. ..	2,132,422	8,785,207	3,796,700
Cambria Iron lease	338,720	338,720	338,720
Net inc.....	$4,175,664	$7,567,535	$25,721,853
Dividends ...	4,050,000	5,400,000	5,400,000
Surplus ...	$ 125,664	$ 2,167,535	$20,321,853

*After deduction of all expenses incident to operation, ordinary repairs and maintenance, approximately $9,000,000 in 1919 and provision for federal taxes.

Trumbull Steel Increase Capitalization

Youngstown, O., May 24.—The Trumbull Steel Co., at a meeting of stockholders held Tuesday, May 18, in Warren, authorized an increase of capital stock from $24,000,000 to $35,000,000, the entire increase of $11,000,000 being common, bringing the total common to $25,900,000. The new authorization presages a stock dividend, possibly of 75 per cent, which will be taken up by the board of directors at an early meeting. In addition $2,000,000 will be set aside for employes who will be permitted to buy at par. Practically all waivers of stockholders for this amount have been secured. Cementation of the alliance between the Cleveland-Cliffs Iron Co. and the Trumbull Steel Co. is seen in the addition of W. G. Mather and F. L. Mather to the Trumbull board of directors, their election at Tuesday's meeting increasing the board from five to seven members.

Crane Co. Lists Stocks

In connection with the listing of its stocks on the Chicago stock exchange, the Crane Co. has issued a statement showing net income for 1919 as $11,363,051. Dividends were paid at the rate of 16 per cent. The par value of the common stock was recently reduced from $100 to $25 a share. The company recently sold $7,000,000 of the preferred stock to employes, $2,500,000 for cash and $4,500,000 on a deferred payment plan. The total authorized preferred stock is $10,000,000, of which $2,810,200 is paid up and listed on the stock exchange. The balance sheet shows current assets of $42,303,550; investments, $2,497,655; value of plant, machinery, etc., less depreciation, $19,558,091; good will, $1,107,599; current liabilities, $9,765,361; reserves, $3,797,796; real estate mortgages, $40,000; first mortgage bonds outstanding, $13,530,500; surplus, $30,924,897.

Fuel & Iron Net Favorable

First quarter earnings of the Colorado Fuel & Iron Co., show a slight gain over the same period one year ago. Gross receipts for the first three months were $10,369,601 against $10,071,785 in the preceding year. Total income was $1,106,213 as compared with $1,078,632 in 1919. The comparative income account follows:

	1920	1919
Gross receipts	$10,369,601	$10,071,785
Operating expenses	9,381,880	9,131,383
Net earn. from op.....	987,720	940,401
Other income	118,493	138,230
Total income	1,106,213	1,078,632
Interest, taxes, etc.	685,644	677,247
Balance	420,569	401,384

Financial Crop Ends

REPORTS of the Greenfield Tap & Die Corp., Springfield, Mass, indicate that 1920 will be the biggest year in the plant's history. The first quarter totals are at the rate of $5,000,000 turnover for the year, which will mean at least $10 a share in dividends after taxes have been paid.

* * *

The Piston Foundries, Inc., Minneapolis, have recently been organized and will assume the obligations of the foundry department of the Farm Motors Co., that city.

* * *

Carnick Brothers Co. of Youngstown has increased its capital stock from $350,000 to $700,000. The increase is for the purpose of doubling the company's scrap yard facilities.

* * *

Report by the Carbon Steel Co., Pittsburgh, for the six months ended March 31 shows that the company lost $131,435 from operations due to the steel and coal strikes which prevailed during that period.

Employes Inviting Radicalism

Charge Made by Speakers at Industrial Relations Association's Convention, Who Criticise Managers for Not Combating Bolshevism in the Shop — "Red" Speakers Finding It too Easy—Employers and Employment Experts Give Opinions

CHICAGO, May 22.—Exacting the position of the foreman to one of great importance as the point of contact of management and labor, and placing the blame for the success of radical propaganda with the employer who has not sought to instruct his workers in the truth, were the outstanding features of the annual convention of the Industrial Relations Association of America in the Auditorium hotel, Chicago, this week.

It was generally agreed that the spread of bolshevist and I. W. W. principles has been easy because such teachings were the only ones offered certain classes of employes, and they accepted them freely because they were not refuted. Speakers agreed that, in the mass, labor is honest and fair, and if the truth is presented it will be accepted and form the basis of action. More than 3000 employment managers from all classes of industry attended the sessions.

Cyrus McCormick Jr., works manager for the International Harvester Co., expressed the belief that early efforts of managers to get the better of the workers and of the wofkers to get the better of the managers created a feeling of distrust which it has been impossible up to this time to overcome. The result is that honest efforts to get together are likely to be mistrusted. He called attention to the fact that his company, through its works council, had been able to settle problems easily.

The question of right relations, said Mr. McCormick, must be solved by education, of the management as well as of the worker.

P. W. Litchfield, vice president and factory manager of the Goodyear Tire & Rubber Co., Akron, O., outlined the growth of the industrial situation from the early beginnings of manufacturing.

L. C. Marshall, dean of the school of commerce and administration of the University of Chicago, who had much experience with labor during the war, urged personnel managers to work effectively to bring men to work together effectively. While the need for this was apparent in time of war it is not so plain in times of peace, but the need still exists.

Frank Powell Raymond, of the Inter-racial council, New York, called attention to the lack of immigration and advocated a lower literacy test.

Home owning as a steadying factor, tying men to the community and to the industry in which they are employed, was advocated by C. A. Lippincott, of the Studebaker Corp., South Bend, Ind., who explained how his company has approached the problem. He condemned the usual "welfare" efforts of employers.

Realizing that labor turnover is the greatest expense of industry, next to labor and material, the Studebaker Corp. worked out a plan by which homes built by the company are sold for a small initial payment and monthly installments, with interest. As an incentive to remain in their jobs men who buy homes are charged no interest while steadily at work, the gain to the company by reducing labor turnover being figured as the equal of interest on deferred payments.

The foreman as an important factor in the industrial world, was discussed by Leroy Kramer, vice president of the Willys, Overland Co., Toledo, O. He defended the foreman as a much abused person, a part of the management directly in contact with the men, but not regarded highly enough and not instructed in his possibilities or rewarded for his accomplishments.

Dudley R. Kennedy, of Philadelphia, who was in charge of industrial relations at Hog Island during the war, criticized managers who have not taken means to combat the spread of radical propaganda. "It is high time," said he, "that we quit criticizing the radicals and those won over by their arguments, and lay the blame where it justly belongs. The foreman is the most important link in the chain of industrial management and the chain is no stronger than its weakest link. He is the point of contact with your men, from who will come your future foreman. You get at least eight hours of their time every day. The radical agitator gets not more than two, probably not over two a week. If he can teach the worker more in that time than you can in eight hours a day, whose fault is it? The foreman can change all this. He can instill confidence and knowledge of the aims of the management, and the men will respond far more readily than they will to the radical teacher. But you don't help your foreman to do this. If this isn't soon made a major part of the foreman's business soon we will have no business."

Why the Link Belt Co., Chicago, operates an open shop and some of the results, was explained by Charles Piez, its president. The company has been conducting an open shop for 13 years, after four agreements with union workers had been broken without reason. This lack of honesty in keeping agreements resulted in the open shop. Then some interesting discoveries were made. An operation in which the limit set by the shop steward was 60 per day was increased by an unskilled man in a week to 100 and for 12 years the average has been 180 per day, and the man is not fatigued.

"Production is the only basis on which to figure wages," he said. "Unfortunately this has been worked to the disadvantage of the men in the past and we must struggle with the honest prejudice that has resulted. Wages can't be set on the basis of the cost of living. It is a fallacy believed by many workers that wages are paid out of capital. Nothing is less true. If our plant should be operated without production and wages go on, the entire capital, the accumulation of 40 years, would be exhausted in a year."

Whiting Williams, who spent seven months among laborers in mines, mills and other places, related his experiences and deductions.

Platform For Industry

THE National Association of Manufacturers at the closing meeting of its silver jubilee convention at the Waldorf-Astoria hotel, New York, Wednesday, May 19, adopted a "platform for American industry," to be submitted at the political conventions, for incorporation in the various political organizations' national platforms. The platform denounces the activities of American labor, maintains that combinations should be regulated, and that strikes and lockouts should be limited by

law; it also advocates a gross sales tax, attacks government ownership, urges operation of the merchant marine by private capital, and denounces a bonus plan for the men who served in the war.

In addition to the adoption of the platform the association adopted a resolution in which all its members voluntarily pledged themselves to reduce the selling price of the commodities which they individually produced, where such can be legitimately done.

The platform as adopted follows in part:

"As it is not the function of our government to own or operate industry but to protect and encourage its legitimate development under private ownership and management, it should abstain from competition with its own citizens in any form of business which they can successfully undertake. The federal trade commission is promoting the perplexity of business men, is persistently inquisitorial beyond its capacity and represents government by men and not by law.

"The right to organize and act in combination, whether by labor or capital, is relative and not absolute, ending where injury to the public interest begins. The public interest demands that this principle, applied to business for twenty-five years, should now be applied to all combinations. The right to strike or lockout must be defined and limited whenever it conflicts with the community's paramount right of self-preservation. The national and state governments should establish control over combinations operating in production and transportation essential to the life of the community. The paramount common interest in continuous public utility service requires the ultimate submission of disputes threatening the interruption of such service to impartial adjudication without depriving the community of it.

"The right to seek and establish employment relations with each other without respect to the membership or nonmembership of either in any organization is an essential part of the personal freedom of employer and employe. The parties must be free to make and maintain their own relationship in such form as is mutually satisfactory."

Other points touched on in the platform was the urging that the excess profits tax be repealed and that a tax on gross final sales be substituted. The return of the railroads to private ownership was approved and adjustment of rail rates urged.

A constructive policy of selective immigration was advocated, and it was maintained that successful commerce and the national security require an adequately, privately owned merchant marine, composed of ships, built in American yards, by American labor and with American capital.

The platform also maintained that "the passage of the Adamson act by the intimidation of congress was the turning point in the alienation of public sympathy with unionism. The loss of the steel, coal and police strikes and the failure of congress to put plums in the Plumb pudding, is further evidence of public dislike. The public should and it is believed can be made to realize that nothing but a united effort of all citizens for thrift and greater industry, can prevent a financial crisis."

Obituaries

JAMES SCOTT, prominent in the development of the American iron and steel industry, especially along the lines of blast furnace practice, died at Mercy hospital, Pittsburgh, recently, following a brief illness. He was born

JAMES SCOTT

in Dalkeith, Scotland, Dec. 8, 1850, and emigrated to this country in 1872, and a few years later he became associated with Andrew Carnegie. Entering the employ of the Carnegie Steel Co. at the Lucy furnace on Jan. 1, 1877, Mr. Scott eventually became general superintendent of the Lucy, Isabella, Edith and Neville blast furnace plants, Pittsburgh. When he retired on Dec. 31, 1912, he was the oldest superintendent in point of service of the company. He had much to do with the introduction of the bronze bosh plate, the modern blast furnace coke bin, the pig casting machine and the first application of the dry blast method originated by the late James Gayley was at the Isabella furnace of the Carnegie Steel Co. under Mr. Scott's direction. He was a member of the Carnegie Veteran association, the American Iron and Steel institute, the Engineers' Society of Western Pennsylvania and the Duquesne club, of Pittsburgh.

John A. Knapp, mining engineer and metallurgist, secretary of the Chicago & Aurora Smelting & Refining Co., died May 22, at his home in New Rochelle, N. Y., aged 72. He was a graduate of the College of the City of New York and Columbia School of Mines.

Charles Francis Stuart died May 20 at his home in New York, of a complication of diseases. He was 68 years of age and retired from active business 20 years ago, having been vice-president of the Western Steel Co. of St. Louis, and for more than 20 years prominent in the iron and steel business in Cleveland.

Dwight H. Coble, aged 46, secretary of the H. C. Frick Coke Co., Pittsburgh, died May 23, at his home in Pittsburgh after a brief illness with pneumonia. He had been associated with various steel corporations and subsidiaries since 1896. At one time he was secretary to the late James Gayley.

George Francis Griffin, aged 39, son of the late Thomas A. Griffin, founder of the Griffin Wheel Co., Chicago, died recently at Miami, Fla., of apoplexy on his return from a sea fishing trip. He had been vice president and general manager of the Griffin Wheel Co., which was sold during 1919 to the American Steel Foundries, at which time he disposed of his large interest.

William T. Hildrup Jr., aged 58, banker and until recently general manager of the Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., died at his home recently. He was educated in the private schools of Harrisburg and West Chester, Pa., and was a graduate of the University of Pennsylvania. From 1882 to 1890 he was connected with the Harrisburg Car Mfg. Co., and was promoted through various positions with this company until he was made secretary and treasurer. In 1890 he organized a limited partnership which was later incorporated as the Harrisburg Pipe & Pipe Bending Co.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

ORGANIZED with offices in the Webster building, 327 South La Salle street, Chicago, the industrial engineering firm of Arison, Goodwin & Knapp is composed of Col. E. E. Arison, L. Reeves Goodwin and L. G. Knapp. The last two had become affiliated some time prior to Colonel Arison's discharge from the United States army in November, 1919. Both had been his associates in the Emerson Co., counseling engineers, formed by him and Harrington Emerson in 1908, of which he was vice president in charge of all business west of Cleveland, with headquarters in Chicago.

Colonel Arison is a member of the American Society of Mechanical Engineers and the Society of Industrial Engineers. After engaging in railroad work he became connected in a small way with the Carborundum Co., Niagara Falls, N. Y. After 10 years he resigned as production manager. He returned to the railroad field and then followed his affiliation with Mr. Emerson in the Emerson Co. In 1917, Colonel Arison was appointed major in the ordnance department, production branch, and became production manager of the Chicago district. Subsequently he was a member of the Chicago claims board, becoming chief of the district and chairman of the board as well as a special member of the war department claims board.

Mr. Goodwin is a chemical engineer, a member of the Society of Industrial Engineers and the Western Efficiency society. He was associated with the Emerson Co. for four years as director, secretary and western manager.

Mr. Knapp is a mechanical engineer, a member of the American Society of Mechanical Engineers, the Society of Industrial Engineers and an associate member of the American Institute of Electrical Engineers.

* * *

ERECTION of a foundry, 60 x 100 feet, is under way for the Walker Machine & Foundry Corp., Roanoke, Va. Practically all the necessary equipment has been ordered.

* * *

FOR the manufacture of a patented die head, dies and thread cutting tools the Leonard Die-Head Co., Inc., Bridgeport, Conn., has incorporated at $50,000. H. T. Leavenworth is president; John B. Dillon is treasurer.

* * *

ERECTION of a foundry, 100 x 120 feet, is under way for the Ft. Dearborn Mfg. Co., Sterling, Ill., to be of brick and concrete construction. This plant will be modernly equipped, and it is expected it will be ready for operation about July 1.

* * *

LITTLE damage was done to the plant of O. V. Hooker & Son, St. Johnsbury, Vt., when fire broke out recently. Practically the entire loss was confined to the office building, and repairs to this structure are now under way. No manufacturing equipment had to be replaced.

* * *

BECAUSE of the large growth in both its foreign and domestic business, the Wetmore Reamer Co., Milwaukee, has found it necessary to enlarge its plant. It is erecting an addition, two stories, 70 x 175 feet, which will be modern in every respect, both as to construction and equipment.

* * *

ERECTION of a new plant for the purpose of manufacturing special automotive tools and filtermass, such as car movers, is contemplated by the Wentink Mfg. Corp., Menasha, Wis. It will be of fireproof construction and special attention will be given to light, heat and ventilation. F. C. Wentink is president.

* * *

THE S. U. Busch Supply Co., St. Louis, recently was reorganized and the company besides increasing its capital, changed its name to the Busch Corp., with headquarters at 13 North Seventh street. The company handles a full line of antifriction factory equipment. Sidney U. Busch is president and general manager.

* * *

THE capital stock of the Tidewater Steel Corp., 149 Broadway, New York, recently was increased in order to care for the company's growing volume of business. The company recently took over the sales agency of the Sligo Iron & Steel Co., which with that of the Nagle Steel Co., Pottstown, Pa., and the Erie Crucible Steel Co., Erie, Pa., has added to its operations.

* * *

THE Abrasive Co., Philadelphia, is erecting a new power plant at an estimated cost of $150,000. This building will be equipped with boilers, engines, dynamos, etc., orders for which have practically all been placed. The company is considering the erection of other additions, but so far plans have not matured.

* * *

PHINEAS JONES & CO., INC., Newark, N. J., are contemplating the erection of a new plant, to be 1-story, 40 x 300 feet, construction to be started the latter part of the summer. This building will be equipped with 12 dry kilns, necessary dry storage sheds, saw room and boiler and engine room, and will be devoted to the manufacture of passenger car and motor truck wheels.

* * *

AN ENLARGEMENT being built at the plant of the A. J. Detlaff Co., 121-129 Lafayette avenue, Detroit, manufacturer of auto parts, gray and malleable iron castings, and operator of a machine and pattern shop, will triple the floor space of its present brass and aluminum foundry. F. R. Lockwood is sales manager and chief engineer.

* * *

CONTRACTORS have completed work on the erection of an extension to the foundry of the Wisconsin Iron & Wire Works, Milwaukee, and all equipment requirements have been satisfied. G. H. Norris is president and treasurer of the company, E. A. Ernest vice president and manager and William F. Kachel, is sales manager.

* * *

THE Akron-Newton Furnace & Machine Co., Youngstown, O., has purchased the plant of the Hall Mfg. Co. at Newton Falls and will engage in the manufacture of automatic signal lights. Machinery will be installed at once and operations are expected to begin within a few weeks. James W. Heller is president; E. D. Reed, vice president; R. W. McCullum, secretary.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

ORGANIZED as industrial manufacturing engineers, the C. L. Sonen Co., 506 Indiana Trust building, Indianapolis, recently was incorporated, and is now completing its plans. At present the company plans to limit the engineering service to the metalworking industries, the scope of its work to include incorporating organizations and preparing plans for manufacturing. A laboratory will be developed where problems incidental to successful manufacturing such as production control, incentive wage payment plans, profit sharing and employe representation in management will be worked out. The company does not plan to erect a plant but is availing itself of other facilities to develop the work which it has outlined. It plans to place in production four or five metal specialties in its laboratory so that the work will be practical and on a commercial basis. Officers of the company are: President, C. L. Sonen; vice president, R. C. Hughes, and secretary and treasurer, W. C. Holmes.

* * *

CONSTRUCTION of a 2-story vault and pattern shop recently was completed for Gray & Dudley Co., Nashville, Tenn. The building is of modern fireproof construction, 40 x 80 feet. In addition the company has under erection a building, 130 x 208 feet, which will be utilized as an addition to its foundry. The company has contracted for all necessary equipment.

* * *

HAVING increased its capital from $25,000 to $100,000, the Liberty Foundry Co. Inc., 1831 Centre Line avenue, Detroit, is building a new foundry on the Detroit Terminal railroad, at the corner of Davison avenue, west, that city. It will require a 36 x 42-inch tumbling barrel for July 1 delivery and a second-hand positive pressure blower with sufficient capacity for a cupola line to 48-inch inside diameter.

* * *

TEMPORARY repairs have been made to the foundry of J. & W. Jolly, Inc., Holyoke, Mass., which was recently damaged by fire, and this building is now being operated to capacity. In addition to this work, the company has had plans prepared for a modern foundry, which will be erected over the present building. The company will be in the market for a 5-ton electric crane and other foundry supplies and equipment.

* * *

THE International Steel Products Co., Hartford, Wis., heretofore manufacturing gas engine mufflers exclusively, is branching out into the production of a pressed steel gasoline tank for automobiles and trucks which will require some additional equipment. Large orders for mufflers have been booked from several large car and truck manufacturers, and considerable of the tank output already has been placed.

* *

CAPITALIZATION of the Lapeer Tractor-Truck Co., Lapeer, Mich., has been increased from $100,000 to $300,000, and the name of the company has been changed to the Lapeer Trailer Corp. This is because the company has discontinued the manufacture of tractors, and in the future will devote all its manufacturing facilities to the building of trailers. The company is not in the market for any additional equipment at this time.

* * *

WITHIN the next 60 or 90 days the St. Louis Blow Pipe & Heating Co., 1948-56 North Ninth street, St. Louis, will be in the market for large quantities of galvanized and steel sheets. Work is being rushed on a new building which will have a frontage of 142½ feet on Chambers street and 125 feet on Ninth street. The company manufactures all kinds of exhaust and blow pipe systems and contemplates producing a new type of factory heater in the new plant.

* * *

ERECTION of a small addition to the main foundry building is progressing at the plant of the Fairmount Foundry & Engineering Works, Woonsocket, R. I. The extension is 40 x 43 feet, and all necessary equipment has been purchased. In addition the company is erecting a machine shop and pattern storage building, 54 x 110 feet. The basement will be used for pattern storage while the ground floor will be utilized as a machine shop.

* * *

ALL necessary equipment for the foundry addition recently erected by the Marshall Furnace Co., Marshall, Mich., has been purchased. The company, however, is planning the erection of another addition and will be in the market for equipment for a foundry and pattern shop, as well as some additional machine shop and cleaning room apparatus. The capital stock of the company recently was increased from $150,000 to $300,000 in order to finance the expansion.

* * *

SALES of the rotating brass furnaces produced by the Booth Electric Furnace Co., 326 West Madison street, Chicago, have mounted rapidly, since this type of equipment was placed on the market last fall. To date, 35 furnaces of this design have been sold, of which 17 have been shipped and nine placed in operation. The shop of this company now is on a production basis and has adequate facilities for turning out furnaces in from six to eight weeks' time from date of order.

* * *

TO PROVIDE for the expansion of its business and to obtain ample plant facilities, the Schaffer Engineering & Equipment Co., Pittsburgh, has sold a large block of its capital stock to the Fawcus Machine Co., that city. The Schaffer company manufactures poidometers, hydrators, coal injectors and screens, etc., while the Fawcus company manufactures gears and special types of machinery at Pittsburgh and Ford City, Pa. The officers of the latter company, who will take active interest in the Schaffer organization are A. F. Cooke Eliot A. Kebler and A. A. Alles Jr. New officers and directors of the Schaffer Engineering & Equipment Co., are A. F. Cooke, president and general manager; J. C. Schaffer, vice president; Eliot A. Kebler, vice president; A. A. Alles Jr., treasurer, and Waller Crow, secretary. The merger is expected to be benefit to both organizations.

Present Machinery Market Dull

Improvement Looked for When Transportation Situation Improves—Labor and Financial Situations Also Make Buyers Defer Purchases—Railroad Orders and Inquiries Represent Current Trading of Size—Crane Orders Small

UNCERTAINTY due to the transportation situation continues to act as a damper upon machine tool trading generally. Coincidently, however, it is the orders and inquiries from railroad companies which continue to represent practically the only activity going on in the various markets. It is hoped, however, that the interstate commerce commission will be able to restore order out of chaos, since with improved deliveries it is thought that the general tone of the industry will improve; it is known that many companies are holding up their building programs, pending an improvement in the situation. The tight money market and the calling in of loans also are serving as deterrents to business.

In the East, the Southern Pacific railroad has been buying heavily and it is estimated that purchases now total around $200,000. It also has been buying heavily in Houston, Tex. Other railroads expected to buy soon are the Norfolk & Western, the Chesapeake & Ohio, the Hocking Valley and the Rock Island, which issued a small inquiry in Chicago. The New York Central continues to withhold its large list from the Cleveland market. The Erie, the Delaware & Lackawanna, the Boston & Maine and the Delaware & Hudson all are expected to issue lists shortly.

Trading for the most part is light and a total absence of sizable business is noted; most of the inquiries being for one or two tools for replacement and filling in purposes. Chief activity on the part of dealers is endeavoring to get goods they have on order shipped and while one or two cancellations have been noted, most users are keen to obtain deliveries of machinery they have ordered.

Two fair-sized inquiries are out in Cleveland, one from the Air-Friction Carburetor Co., Dayton, O., and one from the Standard Spring & Axle Co., Dallas, Tex. Both call for a miscellaneous assortment of machine tools. Automobile and automobile parts companies, as a rule, however, are curtailing their purchases and in many cases are laying off men. A lowered demand for the finished product is traced to the refusal of banks to discount notes given in payment for automobiles.

Crane business also is relatively dull. Buyers in the Pittsburgh district show a decided inclination to defer purchases. In New York and Cleveland crane inquiries ask for one or two units only and orders are scarce. The American Metal Co., New York City, bought two, while the Brooklyn Rapid Transit Co., the Stone & Webster Co., Lowell, Mass., H. F. Curtis, New York, Brown Co., Berlin, N. H.; Atmospheric Nitrogen Co., Syracuse, N. Y., each one.

Southern Pacific Purchase a Feature in the East

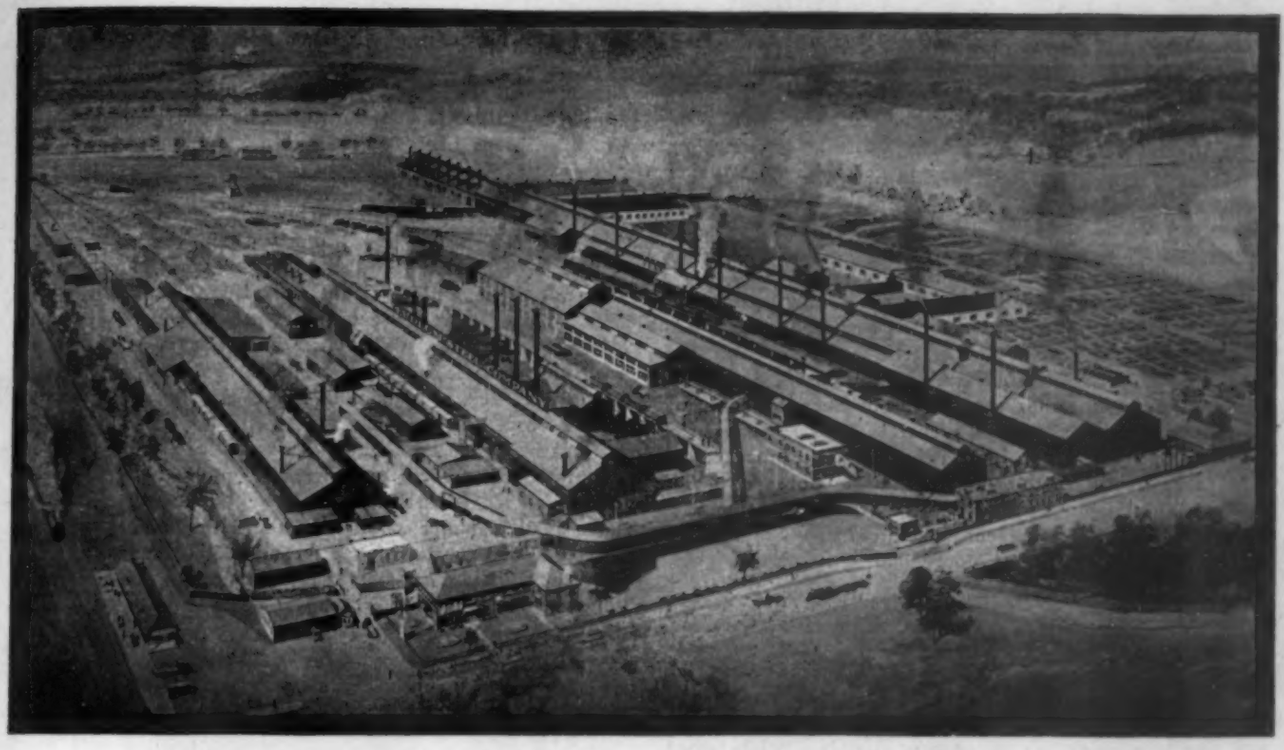
NEW YORK, May 22.—Concluding purchases, aggregating more than $200,000, the Southern Pacific railroad stands out as the largest buyer of machine tools in the transportation field at this time. In fact, the portion of this business which went to eastern manufacturers appears to represent the only sizable amount of railroad buying in this district. However, much interest continues to be centered in railroad requirements, as the Norfolk & Western and Chesapeake & Ohio are expected to close on substantial lists at any time, and the Erie and Delaware & Lackawanna railroads are likely to bring out good-sized inquiries shortly. The latter railroads as recently reported, closed on some special equipment, but as yet have done little buying of standard machinery. In addition, the Boston & Maine, New York Central and Delaware & Hudson are regarded as likely buyers of the near future.

Trading generally during the past week has been light, and until there is some improvement in the transportation situation, which has materially affected production at all industrial centers and has made deliveries practically impossible, there is likely to be little change for the better. Some labor trouble is in evidence at Waterbury, Conn., machinists there having demanded a 44-hour week and a 35 per cent wage increase, but the situation generally throughout the East in this respect is satisfactory to equipment manufacturers.

Of interest to the trade is the announcement that the Drydocks & Ship Repair Corp., Philadelphia, has obtained a lease on property in Camden, N. J., for the erection of drydocks and a repair plant, costing approximately $4,500,000. John Meigs, former director of wharves, docks and ferries, Philadelphia, is president of the corporation.

Among crane awards of the past week are a couple of 10-ton electric cranes for the American Metal Co., 61 Broadway, New York City. They are to be built by the Morgan Engineering Co., Alliance, O., and are to have spans of 20 and 50 feet, respectively. The Brooklyn Rapid Transit Co. has purchased a 7½-ton electric crane, with 17-foot span, from the Erie Steel Construction Co., Erie, Pa. The H. G. Vogal Co., 487 Broadway, New York City, has postponed indefinitely the purchase of a 3-ton electric overhead crane.

Trading has included several locomotive cranes. A 20-ton Browning crane has been bought by Stone & Webster, Boston, for Lowell, Mass.; a 35-ton Ohio crane by H. F. Curtis, 1270 Broadway, New York City; a 20-ton second hand crane by the Brown Co., Berlin, N. H.; and a 25-ton used locomotive crane by the J. G. White Engi-



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neering Co., 43 Exchange place, New York City, for the Atmospheric Nitrogen Co., Syracuse, N. Y., the order going to the Titan Equipment Co., 30 Church street, New York City.

The six overhead cranes for the Cambria Steel Co.'s plant at Johnstown, Pa., three of 10-ton capacity and three of 20, recently reported as placed with an Alliance, O., builder, went to the Morgan Engineering Co. The Cascade Foundry Co., Erie, Pa., has purchased a 2-ton electric crane, with 24-foot span, from the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., and the Saco-Lowell Co., Lowell, Mass., and the Automobiles Berliet, Lyons, France, two 2-ton electric cranes, with 38-foot span, and one 5-ton electric crane, with 59-foot span, respectively. A southern manufacturer placed five overhead electric cranes also with the Shepard company. The Amoskeag Mfg. Co., Manchester, N. H., may bring out new specifications; it has been in the market for some time for a 60-ton crane, with 52-foot span. The Federal Shipbuilding Corp., Kearney, N. J., is inquiring for a floor instead cage controlled crane. The crane is of 5 tons capacity and 45-foot span.

Market Still Reflects Strained Condition

PITTSBURGH, May 25.—Activities in the machinery and equipment market here still reflect the uncertainty which recently has crept into the industrial situation as a result of the railroad transportation situation and the stringency in the money market. While steady day to day buying is observed in machine tools and dealers are making fairly good sales from the floor, no important lists are coming out, while in cranes and other heavy equipment, the tendency still is marked among buyers to defer purchases. Transportation conditions continue to hold deliveries in check and these also keep down the supplies of materials for manufacturers.

Improvements and extensions at the plant of the Cambria Steel Co., Johnstown, Pa., it is now estimated, will involve the expenditure of more than $40,000,000 and the work is progressing steadily. Much of the equipment required for the immediate work on this project already has been placed.

Chicago Business Seems Dull

CHICAGO, May 24.—Inquiry for machine tools is found by Chicago dealers to be considerably less than was the case early in the year, and while some sellers are busy, others find business decidedly dull. Restriction of credit and lessened plant operation, because of the railroad situation, probably are largely the cause of this condition. Shipments continue to be slow as railroads have not yet removed all their embargoes and much machinery ready for delivery is held up in warehouses. The strike at Cincinnati is being felt to some extent, but its full effects are expected to show themselves later. Collections have been delayed somewhat in many instances, although this is not yet sufficiently marked to be a feature. Advances have been made on numerous lines, including milling machines, heavy duty drills and keyseaters, the general advance being about 10 per cent. Railroads are not active, and lists already issued have not resulted in sales. The Rock Island railroad has put out a small list, including a 36-inch and a 54-inch planer, a 36-inch drill press, a 48-inch vertical boring mill, an 18-inch and a 36-inch lathe, and an 18-inch fox lathe. The Barco Mfg. Co., Chicago, is building a plant for the manufacture of railroad supplies. The Duvoal-Ingraham Steel Co., Chicago, is building a foundry and machine shop. The American Furnace & Foundry Co., Milan, Mich., is building a foundry. The Jefferson Forged Products Co., Detroit, will build an addition to its forge shop. The Walcott Lathe Co., Jackson, Mich., will build an addition to be used as a drop forge shop. The Eclipse Mfg. Co., Hammond, Ind., will build a 4-story plant for the production of automobile parts and gears.

Finance and Transportation Factors Still Interfere

CLEVELAND, May 25.—Due to the situation as regards finances and transportation, the present machine tool market in this district, while not entirely stagnant, is exceedingly quiet. A dearth of both orders and inquiries exist, because users are unable to anticipate what the next few weeks will bring forth. One prominent dealer described the business of the past week or 10 days as being "spasmodic." He said that while orders were scarce, he had booked one for $17,000 worth of automatics and another buyer was due to close for about $20,000 worth of furnace equipment. The Efficient Vise & Wrench Co., and the Upson Nut Co., both have made smaller purchases, the latter taking approximately $3500 worth of special nutmaking machinery.

A lack of orders from the automotive trade is noted in particular and this is said to be the indirect result of the Federal Reserve bank refusing to discount what is known as "automobile" paper, issued by purchasers of automobiles on time; the direct result being a decrease in the demand for automobiles making unnecessary the pressure upon automobile and parts plants. Many of these now are understood to be laying off men, particularly in Ohio.

Practically the only sizable business being considered in the Cleveland market is railroad business and action on issued lists is postponed and among others, the New York Central is holding up issuance of its list, which has been expected for several weeks.

The tangled railroad situation still is a bugbear among shippers of machine tools, although some little improvement is noted in the distribution of eastern manufactures in the west. Carload shipments are made up in the east and sent to Cleveland for distribution of the contents to various nearby destinations. Embargoes, however, operate against the products made in Cleveland when it comes to distributing them in the east. One buyer of machine tool equipment in Cleveland, came by motor truck from Kane, Pa., in order to be assured of delivery.

Due to these conditions various buyers are disinclined to place orders, and because of existing uncertainty, a few are cancelling their orders, although this practice is not by any means widespread. One such cancellation came from Fairbanks Co., Buffalo, on pipe machinery. Other users who have had machinery on order for some time are writing and telegraphing sellers for deliveries. The Supreme Motors Co., Warren, O., and the Cleveland Tractor Co., Cleveland, are among those who are asking for early shipment of multiple spindle drills.

Demand has fallen off considerably and only those machines are being asked for which are absolutely needed for replacement and fill-in purposes. One of the largest inquiries comes from the Air-Friction Carburetor Co., Dayton, O., J. A. Whyte, manager, which recently increased its capital to provide for expansion and the purchase of several screw machines, punch presses, milling machines, drills, etc. The Bruce-MacBeth Engine Co., Cleveland, wants a 36 x 36-inch x 14-foot Ohio planer, while the Buckeye Steel Castings Co., Columbus, O., is in the market for a 24 x 24-inch x 12-foot Woodward & Powell planer. The Willys-Knight Co., Toledo, O., is understood to be still in the market for planers and shapers and the National Supply Co., that city, is

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Masonic Temple, Mobile
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in need of cranes, monorail equipment and coal handling machinery, etc. The Hercules Motor Mfg. Co., Canton, O., and the Pierce-Arrow Motor Car Co., Buffalo, are both understood to be in the market for multiple spindle drilling machines. The Channon-Emery Stove Co., Quincy, Ill., is in the market for a punch press for stamping stove doorframes and panels, etc. It also wants trucks for handling pig iron, scrap iron and coke from yard to cupola and one small saw for its carpenter shop. The Perfection Piston Ring Co., Ravenna, O., is in the market for some chucks. The Torbensen Axle Co., Cleveland, recently reported as purchasing multiple spindle drills, only bought multiple spindle drill heads. The Mansfield Sheet Steel Co., Mansfield, O., wants among other machines, one lathe. The American Clay Machinery Co., Bucyrus, O., is understood to be in the market for considerable furnace machinery, while conveying machinery is wanted by the Elwood-Myers Co., Springfield, O., for its new 88 x 109-foot building.

An item of interest to the trade is the purchase by Morey & Co., Broome & Lafayette streets, New York, of about 40 representative machine tools from the plant of the Minneapolis Steel & Machinery Co., Minneapolis, which it now is selling. Another interesting item is the purchase by the W. M. Pattison Supply Co., Cleveland, of the store and warehouse, formerly occupied by the D. M. Osborne Machinery Co., 221 St. Clair avenue, that city. The Pattison company will use this for a downtown sales room for used machinery.

Inquiries which come from a distance to some Cleveland sellers include a list by the Standard Spring & Axle Co., Dallas, Tex., covering four engine lathes, two milling machines and one each automatic, grinder, power hacksaw, centering machine, drill press and sensitive drill. The American Wringer Co., Woonsocker, R. I., which is erecting two new buildings, is in the market for a 15-ton electric traveling crane, one large lathe and several grinders. J. & W. Jolly, Inc., Holyoke, Mass., is in the market for a 5-ton electric traveling crane as well as sundry equipment for a new foundry. The Fort Dearborn Mfg. Co., Sterling, Ill., is installing equipment to turn out small and medium sized gray iron castings in a new foundry, 100 x 120 feet, both for its own use and job-work for outsiders. The Hydraulic Machinery Mfg. Co., Port Neches, Tex., will buy machinery and equipment in several weeks for a 3-unit plant, 60 x 140 feet for foundry, plate shop and machine shop. Engine and boiler equipment is wanted by the Sturgis Steel Go-Cart Co., Sturgis, Mich.

Other prospective purchasers of machine tool equipment include the Service Motor Truck Co., Wabash, Ind., which is erecting a 75 x 775-foot building to increase truck production; the Marshall Furnace Co., Marshall, Mich., which doubled its capital to $300,000 for the enlargement of its foundry and machine shop; the American Electric Co., Toronto, O., which has bought 42 acres on which a large plant will be erected; the Colburn Safety Device Co., Fairmont, W. Va., recently incorporated with a capital of $100,000 to manufacture safety appliances; the Eclipse Mfg. Co., Hammond, Ind., to build a 4-story plant, 76 x 129 feet to manufacture automobile parts, gears, etc.; and the Curran-Detroit Radiator Co., Detroit, which has increased its capital from $300,000 to $1,000,000.

Sale of American Tools Retarded in Canada

TORONTO, Ont., May 22.—No falling off in the number of inquiries for machinery and tools in the Canadian market has been noted. Particularly is this the case with smaller buyers or manufacturers who require tools for replacement purposes. Dealers still are far behind on deliveries, some from six to eight months or even longer. On this account the demand for second hand equipment continues active and some dealers report good sales in rebuilt machinery.

Representatives of British machine tool manufacturers state that delivery is improving on equipment from England. This is particularly true in the case of supplies and in some cases users of small tools have been given better satisfaction in way of deliveries when the articles were ordered from England. In one case a quantity of drills ordered from England reached the customer here three weeks after placing of the order. According to the present outlook British manufacturers of machinery and tools are making a strong bid to regain the solid footing they held in the Canadian market previous to the war.

The railway embargo underway in the United States continues to be a detriment to the sale of American machinery and tools and instead of improving, deliveries are becoming more and more uncertain. The uncertainty of delivery from American producers and the high exchange rate on American funds are giving the British houses a great opportunity to increase sales in Canada.

Several manufacturing concerns announce plans for new factories and additions to plants and are asking for prices on equipment and machinery for same. A. S. MacGregor, Georgetown, P. E. I., is interested in a concern which proposes to construct a marine railway and a floating or dry dock, and desires information and details as to cost of construction, equipment, etc. The North American Antimony & Smelting Co., Lake George, N. B., W. F. Dickson, Dufferin hotel, St. John, N. B., manager, is in the market for concentrating plant with capacity of 100 to 200 tons daily; also for one 35 to 50-horsepower portable boiler. F. W. G. Anderson, 1056 Granville street, Vancouver, will require woodworking machinery. The Electric Repair & Supply Co., 71 Wellington street, Sherbrooke, Que., will build a $10,000 motor repair shop and will buy equipment. The Three Rivers Shipyard Co., and the National Shipbuilding Co., Three Rivers, Que., L. Abbe purchasing agent, will build blacksmith and machine shops to replace those destroyed by fire and will purchase new machinery, tools, etc. The Amerlin Co., Petrolia, Ont., will build an addition to its plant and install new machinery. John Hall & Sons, Brantford, Ont., will build an addition to their present plant and install new equipment to manufacture pipe machinery, etc.

Cuba Continues Sugarmaking Machinery Demand

BIRMINGHAM, Ala., May 24.—Southern machinery and supply men returning from the convention at Atlantic City last week, report an interesting and successful gathering, although many of them are confirmed in their original thought that the meetings of the Southern Supply and Machinery Dealers association should be held in the south hereafter. A continued demand is noted, although not many new orders are being placed. Sugarmaking machinery continues to find a ready market in Cuba and road building machinery is going to Argentina and other South American countries.

Buying by the Southern Pacific railroad, Houston, Tex., continues, and while a large portion of this is going to northern sellers, some is being placed in the South. Other roads are holding up their lists and several are preparing inquiries for early issuance. A tendency to ask for prices for estimating purposes only is noted.

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We told him the following story, gave him a copy of "The Restoration of a Lost Art," and went our way.

Here is the story:

At a meeting of the Committee appointed to prepare the new Dictionary of the French language, one of the members was asked to define the word "Lobster". He replied "The lobster is a fish, red in color."

The Chairman immediately retorted: "My learned friend is right except in two unimportant details. A lobster is not red, neither is it a fish."

The next morning the Chief Engineer called us up and said: "I have read your book and guess I was the Frenchman. Send me a thousand pounds of your metal."

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Among New England Plants

PORTLAND, ME.—Plans are being made for an addition to the Portland Stove Foundry. It will be three stories, 18 x 48 feet, and will cost $25,000.

PORTLAND, ME.—Announcement is made by the National Seal Co., Inc., formerly owned and conducted by the National Metal Seal Corp., that extensive additions will be made to the plant.

BRATTLEBORO, VT.—The C. F. Church Co. has let the contract for a 1-story and basement, 50 x 170-foot plant to cost $100,000, to contain a machine shop and boiler house.

BOSTON.—Automobile Appliance Co. has been incorporated for $50,000. Oliver A. Wyman, 617 Old South building, Boston, is one of the incorporators.

BROCKTON, MASS.—Work has started on the erection of a building for the Treeing Machine Co.

CHARLESTOWN, MASS.—The Crosby Steam Gauge & Valve Co. has plans for a foundry extension, 45 x 104 feet.

EVERETT, MASS.—The Crocker Pen Co., Boston, will erect a 1-story, 60 x 120-foot plant.

LYNN, MASS.—The Harney-Grobe Service Co. has been incorporated to make electrical and mechanical goods with $10,000 capital by Thomas F. Harney Jr., H. B. Grobe Jr. and Thomas F. Harney.

SPRINGFIELD, MASS.—The Atlas Machine & Tool Co. has been incorporated with $20,000 capital by John A. Peterson, Helge Welin and John Almgren.

SPRINGFIELD, MASS.—The United Electric Co., New London, Conn., has let the contract for a transformer building to cost $200,000.

SPRINGFIELD, MASS.—The Rice-Durfee Co. has been incorporated to build machinery, etc., with $25,000 capital by Charles A. A. Rice, James A. Durfee and L. F. Hardy.

WESTFIELD, MASS.—The Westfield Mfg. Co. has let the contract for a 1-story plant addition.

WEST SPRINGFIELD, MASS.—Plans are being made for a 1-story, 90 x 200-foot mill for the Wico Electric Co. to cost $100,000.

WORCESTER, MASS.—Foundations are being laid for a 6-story, 75 x 130-foot manufacturing building for the Norton Co. to cost $300,000.

WORCESTER, MASS.—The contract has been let for a 1-story, 130 x 150-foot forge shop, a 40 x 50-foot boiler house and a 1-story, 48 x 62-foot oil storage, sand blasting, and shipping building, all as additions to the plant of the Rogers Drop Forging Co.

PAWTUCKET, R. I.—Plans have been drawn for a factory for the New England Machine & Electric Co.

PROVIDENCE, R. I.—The Martin Brass Foundry has been established here with offices at 799 Eddy street. The concern, which was formerly located in Quebec, Canada, is engaged in the manufacture of brass and bronze castings and solder. P. A. Beaulieu is manager and president.

WARREN, R. I.—Plans are being drawn for the Greyhound Motors Corp. for a 1-story, 100 x 200-foot factory.

WOONSOCKET, R. I.—Plans are being drawn for a 3-story, 66 x 180-foot mechanical roll building for the American Wringer Co.

BRIDGEPORT, CONN.—The William V. Dee Co. has been incorporated to make marine fittings, supplies, etc., with $50,000 capital by W. V. Dee, D. S. Day and Jonathan Grout, Fairfield, Conn.

GREENFIELD, MASS.—The W. E. Nichols' Sons Co. has been incorporated to build machinery with a capital of $50,000, by M. H. Nichols, Walter H. Nichols and George E. Shaw.

GREENWICH, CONN.—The Greenwich Yacht & Motor Corp. has been incorporated for $40,000. S. G. Wingapaw is one of the incorporators.

GREENWICH, CONN.—The Port Chester Pneumatic Tool Co., Inc., has been incorporated to make tools, motors, etc., with $200,000 capital by T. S. Thompson, Daniel Thompson and Harry Thompson, all of East Port Chester.

HARTFORD, CONN.—Plans are being drawn for a 2-story, 50 x 125-foot machine shop to cost $125,000 for the city.

HIGGANUM, CONN.—The Cutaway Harrow Co., a branch of Bateman & Co., Inc., New York, will erect a plant addition to cost from $75,000 to $100,000, which will double its capacity.

HUDSON, MASS.—The Hudson Broach Co. recently was incorporated with a capital of $50,000, to operate a foundry and machine shop, by Ralph R. Lapointe, Fred B. Dawes and Frank F. Cutting.

NEW HAVEN, CONN.—The Joyland Mfg. Co. has been incorporated to make toys with $10,000 capital by A. H. Nodelman, David Nodelman, Mayer Kassin, R. Nodelman and W. J. Walsh.

STAMFORD, CONN.—The Petroleum Heat & Power Co. plans a foundry and electric power plant.

WATERBURY, CONN.—The American Pin Co. plans the erection of an addition to its plant, 2 stories, 38 x 101 feet.

North Atlantic States

ALBANY, N. Y.—The Simmons Economy Tool Corp., 981 Broadway, plans the erection of a plant at an estimated cost of $73,000.

BINGHAMTON, N. Y.—The Sauredde Mfg. Corp. has been incorporated to make automobile wheels with a capital stock of $500,000, by C. Sauredde, J. A. Curts and E. J. Sweeney.

NEW YORK.—The Universal Iron Foundry and John F. Pitz, Inc., 21 Rose street, have been merged with the Pitz & Weber Iron Foundry.

NEW YORK.—The Theurer Wagon Works has been incorporated with a capital of $50,000, by H. and C. Steinka and P. H. Mellmer, 140 Nassau street, to manufacture wagons, etc.

NEW YORK.—The Luna Tin Mfg. Co. has been incorporated to make metal specialties with a capital of $10,000, by H. Nodler, I. Brodie and S. W. Harris, 1713 Second avenue.

ROME, N. Y.—The Rome Mfg. Co. has increased its capital from $850,000 to $3,000,000.

STATEN ISLAND, N. Y.—The Johnson Shipyards Corp. has acquired a site, 152 x 171 feet.

TONAWANDA, N. Y.—The Columbus McKinnon Chain Co. has awarded a contract for an addition to its plant.

ALLENTOWN, PA.—The Aldrich Pump Co. has broken ground for the erection of plant extensions.

BIRDSBORO, PA.—The Birdsboro Steel Foundry & Machine Co. has awarded contracts to Hughes-Foulkrod for plant additions, including an office building.

COUDERSPORT, PA.—The Graham Roller Bearing Co. plans the erection of a 1-story addition, 30 x 100 feet.

ERIE, PA.—The Hays Mfg. Co. plans the erection of a plant, 2 stories, 55 x 115 feet, to be built at an estimated cost of $75,000.

McKEESPORT, PA.—The Columbiana Foundry Co. plans the erection of a foundry to be built at an estimated cost of $200,000.

OAKS, PA.—The Oaks Engineering & Machine Co. has been incorporated with a capital of $60,000, by James K. Roland, West Reading, Pa., George W. Brown Jr. and Samuel R. Staley.

PHILADELPHIA.—The Crane Co., manufacturer of steam specialties, proposes to move into a brick building at Master street and Germantown avenue.

PHILADELPHIA.—A $35,000 building addition will be erected by the Harrison Safety Boiler Works, Seventeenth street.

PHILADELPHIA.—The Monarch Mfg. Co. has awarded a contract for the erection of a plant addition.

PHILADELPHIA.—The Surpass Leather Co., 901 Westmoreland street, plans the erection of a 1-story

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Sandusky, Ohio, U. S. A.

Makers of Steel Castings that are a little better— than the next best —

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machine shop to be built at an estimated cost of $20,000.

PHILADELPHIA.—The Premier Motor Corp. of America, 810 Pennsylvania building, has been incorporated to manufacture marine motors, by T. O'Leary and others.

PHILADELPHIA.—The Ace Motor Corp., manufacturer of motor cycles and bicycles has acquired the former plant of the Savage Arms Co., Erie avenue and Sepviva street.

PHILADELPHIA.—The Cramer Steel Products Co. has been incorporated with $50,000 capital, to manufacture furniture and accessories. F. L. Crasser is one of the incorporators.

PHILADELPHIA.—The Eversady Machine Co. has been incorporated with a capital of $5000, by William J. Freihofer, Arthur J. Litty and Arthur R. Baldwin.

PHILADELPHIA.—The Ideal Foundry Co. has been incorporated with a capital of $5000, by W. F. Baer, Narbeth, Pa., David H. Kinley, Oliver C. Reithmiller and others.

PHILADELPHIA.—The Nasel Engineering & Machine Works has been incorporated with a capital of $200,000, by J. Milton Nasel, Ralph W. Nasel, Carl H. Wackernagel and others.

PHILADELPHIA.—The Precision & Thread Grinder Mfg. Co. recently was incorporated with a capital of $10,000, by Henry N. Merritt, F. R. Hansell, G. H. B. Martin and J. Vernon Pimm.

PHILADELPHIA.—The Geyer Depositing Machinery Corp. has been incorporated with a capital of $10,000, by Eugene H. Davis, John F. Geyer and Noah Walker.

PITTSBURGH.—The Pressed Steel Construction Co. has been incorporated with a capital of $50,000, by R. R. Downey, Clarence A. Williams, T. D. Nesbit and others.

PITTSBURGH.—N. C. Davison Gas Burner & Welding Co., recently was incorporated with a capital of $15,000 by N. C. Davison, Sewickley, Pa., F. F. Davison and M. E. Kuhn.

PITTSBURGH.—The Armstrong Cork Co. has purchased property at 703 Pressley street, 60 x 190 feet and contains a brick dwelling, which will be razed to make way for a factory building.

PITTSBURGH.—John Gobson Jr. representing a company which will spend $100,000 for an automobile construction building, has purchased property at Penn and Richland avenues. The site is 150 x 205 feet.

POTTSTOWN, PA.—The Spicer Mfg. Co. plans the erection of a 1-story machine shop at an estimated cost of $50,000.

SCHENECTADY, N. Y.—The Pendell Boiler Co. recently was incorporated with a capital stock of $100,000, by M. Everetts, O. Pendell and F. Weinberg.

SOUDERTON, PA.—The Penn Washer Co. plans the erection of an addition to its machine shop.

UNIONTOWN, PA.—The Atcheson coke plant of the Republic Iron & Steel Co., idle for more than a year, has been purchased by Connellsville, Uniontown and Pittsburgh interests. Directors of the new company include E. Lorry Humes, United States district attorney, and C. Gregg Llewellyn, collector of internal revenue, Pittsburgh.

WEST HAZLETON, PA.—The foundry of the Gross Mfg. Co. recently was damaged by fire. The loss was estimated at $25,000. It will be rebuilt.

WILKES-BARRE, PA.—The Skelton Axle & Spring Co. plans the erection of a heating plant, 1 story, 40 x 80 feet, to be built at an estimated cost of $15,000.

BRIDGETON, N. J.—The Ferracute Machine Co. has increased its capital from $200,000 to $500,000.

HOBOKEN, N. J.—The White Metal Mfg. Co. has plans for the erection of a power plant to cost about $60,000.

JERSEY CITY, N. J.—The Hoole Tool & Supply Co. has been incorporated with a capital of $125,000, by R. and C. H. Hoole, and others.

NEWARK, N. J.—The American Pipe Bending Co., Harrison, N. J., will build a plant here, 1-story, 60 x 120 feet, at an estimated cost of $15,000.

NEWARK, N. J.—The Gamon Meter Co., 286 South street, plans the erection of a plant addition, to be built at an estimated cost of $8000.

NEWARK, N. J.—The Newark Steel Co., 260 Chadwick avenue, has been organized to manufacture iron and steel products, by Reginald R. Allen and others.

NUTLEY, N. J.—The Nutley Auto Body Co., 54 Washington street, has been organized by I. Sidna and others.

TRENTON, N. J.—The Camden Steel Works has been incorporated with a capital of $100,000, by James Kennelly, A. T. Culbertson and H. I. Koehler.

TRENTON, N. J.—The Foundry Co. has been incorporated with a capital of $250,000, by C. L. Constant, Goodwin Block and E. C. Rohman.

BALTIMORE.—The Kennedy Corp. plans the erection of a foundry to be built at an estimated cost of $100,000.

Central States Activity

MILWAUKEE.—The Snap-On Wrench Co., recently incorporated, has leased factory space and will engage in the manufacture of wrenches, etc.

MILWAUKEE.—The Interstate Pattern Co. has been incorporated with a capital of $15,000, by A. G. Hensel, James T. Gregerson and Edwin Christiansen, and will build a pattern shop.

MILWAUKEE.—Fred Brune Co. has been incorporated with a capital of $60,000 to succeed to the business of Fred Brune, manufacturer of special machinery. The incorporators include L. Brune and William H. Jenter.

PLYMOUTH, WIS.—The Plymouth Foundry & Machine Co. is gaining additional capacity by the acquisition of the old city hall building which will be remodeled into offices and warehouse.

RACINE, WIS.—Articles of incorporation have been filed by the Western Eagle Mfg. Co. with a capital of $50,000, to manufacture wood and metal patterns, by M. Peterson, J. Diehl and E. J. Albert.

SHEBOYGAN, WIS.—The Loeffler Machine Co. has let contracts for a gray iron foundry, 40 x 180 feet.

WAUKESHA, WIS.—The Ladewig Co., automatic bottling machinery, is building a 1-story shop addition, 50 x 60 feet.

BAD AXE, MICH.—The Huron Truck Co. which plans to establish a motor truck plant here, is disposing of $300,000 of capital stock.

DETROIT.—The Ellwood Machine & Tool Co. has been incorporated with a capital of $30,000, by W. T. Elliott, 70 Prentis avenue, and others.

DETROIT.—The Monarch Drop Forge Co. has been incorporated with a capital of $20,000, by E. F. Westover, 351 Cleveland street, and others.

DETROIT.—The Jefferson Forge Products Co. has had plans drawn for the erection of a shop addition, 1 story, 40 x 125 feet.

DETROIT.—The Fletcher Machine Co., 547 McDougall street, plans the erection of a machine shop, 1 story, 30 x 96 feet, to be built at an estimated cost of $10,000.

DETROIT.—The Congress Tool & Die Co., 7 East Fort street, plans the erection of a 1-story machine shop, 55 x 116 feet, to be built at a cost of $20,000.

DETROIT.—The Autoware Corp. has purchased the plant of the Detroit Wire Wheel Corp. for the manufacture of wire wheels. E. E. Johnston of Buffalo, is president of the Autoware Co., and U. S. Ash, Detroit, is vice president and general manager.

GRAND RAPIDS, MICH.—A company has been formed by R. D. Bourds and G. O. Bouchard, for the manufacture of piston rings.

JACKSON, MICH.—The Central Screw Co. plans the erection of a plant, 1 story, 60 x 69 feet, to be built at an estimated cost of $20,000.

JACKSON, MICH.—The General Machine & Tool Co. plans the erection of a plant, 1 story, 92 x 142 feet, to cost $50,000.

CHICAGO.—The Edison Electric Appliance Co. plans the erection of a boiler house, 1-story, 50 x 80 feet.

CHICAGO.—The Humboldt Iron Works, 139 North Clark street, plans the erection of a 1-story addition to its plant.

CHICAGO.—H. C. Saal, 1810Montrose avenue, is drawing plans for the erection of a plant, 3 stories, 120 x 200 feet, to be built at an estimated cost of $200,000.

MOLINE, ILL.—The Borg & Beck Mfg. Co. has increased its capital from $1,000,000 to $5,000,000.

PEKIN, ILL.—The Illinois Metal Co. plans the erection of a warehouse at an estimated cost of $15,000.

SOUTH BEND, IND.—The Campbell Wire Specialty Works plans the erection of a factory building, 1 story, 66 x 156 feet, to be built at an estimated cost of $60,000.

ASHLAND, O.—The Albo Co. plans the erection of a plant to be built at an estimated cost of $200,000.

CANTON, O.—The Miller Pasteurizing Machine Co. contemplates the erection of a plant to be built at an estimated cost of $100,000.

CLEVELAND.—The Piston Ring Castings Co. has increased its capital from $25,000 to $100,000.

CLEVELAND.—The Commercial Forgings Co. has increased its capital from $20,000 to $110,000.

CLEVELAND.—The Clay Engine Mfg. Co. has increased its capital from $56,000 to $106,000.

CLEVELAND.—The Laundryette Mfg. Co., which recently increased its capital, plans to erect a 3-story plant addition, 200 x 200 feet.

CLEVELAND.—The Virden Mfg. Co. plans the erection of a 2-story plant addition, 40 x 94 feet, to be built at a cost of $50,000.

CLEVELAND.—The Superior Screw & Bolt Mfg. Co. has been incorporated with a capital of $500,000, by N. T. Jones, M. J. Riley and others.

CLEVELAND.—The Ohio Crank Shaft Co. has been incorporated with a capital of $100,000, by W. C. Dunn, F. S. Denneen and others.

CLEVELAND.—The Electric Vacuum Cleaner Co. plans the erection of an addition to its plant, 132 x 200 feet, to be built at an estimated cost of $50,000.

CLEVELAND.—The Star Machine & Tool Co. recently was incorporated by J. J. Shurger, L. Eble, M. B. Pennell, L. E. Giel and A. W. Bell, with a capital stock of $25,000.

CLEVELAND.—The Clark & Mesker Milling Machine Co. has been incorporated with a capital of $500,000, by H. O. Mirke, W. H. Annat and others.

COLUMBUS, O.—The Union Fork & Hoe Co. plans a plant addition, two stories, 28 x 37 feet.

CONNERSVILLE, IND.—The A. L. Stone Road Machinery Co. has been incorporated with a capital

Rear view of a Four Way Unit built for Service. All metal construction showing hot and cold shelves set directly over the front end of the counter. These shelves not only keep the food in proper condition, but facilitate the services.

BUILT BY

THE RUSS MANUFACTURING COMPANY

CLEVELAND, OHIO

Designed and Installed by

THE WILLCOX SYSTEM

333 The Arcade, Cleveland

Detailed information cheerfully furnished

Auxiliary Factory Unit designed for service and space. Used in busy factories where dining room space is not available. This Unit is inexpensive and has sixty lineal feet of display service.

All equipment designed and built to suit your purposes, also installed by a method that guarantees a self-supporting INDUSTRIAL SERVICE CAFETERIA

stock of $100,000, by A. L. Stone, Charles K. Stone and A. A. Lease to manufacture road machinery.

DAYTON, O.—The Dayton Standard Scale Co. plans the erection of a foundry, 40 x 80 feet, to be built at an estimated cost of $10,000.

FOSTORIA, O.—The Seneca Wire & Mfg. Co. has plans for a 1-story plant addition, 167 x 208 feet, to be built at a cost of $100,000.

LISBON, O.—The Wright Mfg. Co. is beginning the erection of a foundry and forge shop.

RAVENNA, O.—The Ravenna Furnace & Heating Co. plans to enlarge its plant by an extension to its foundry, 64 x 80 feet.

SPRINGFIELD, O.—The Elwood Myers Co., manufacturer of metal specialties, will build a 3-story plant addition, 80 x 80 feet, at a cost of $75,000.

SPRINGFIELD, O.—The Springfield Finished Castings Co. has been incorporated with a capital of $75,000, by T. R. Ludlow, J. Turner, T. W. Ludlow, G. F. Ilgen and W. E. Showalter.

TOLEDO, O.—The Toledo Milling Machine Co. has plans for a plant, 2-stories, 80 x 200 feet, to cost $70,000.

TOLEDO, O.—The Toledo Acme Tool Co. has been incorporated with a capital of $50,000, by F. Rundquist, L. E. Gorman and others.

TOLEDO, O.—The Lock Drive Axle Co. recently was incorporated with a capital of $9000, by G. S. Gundersen, A. H. Seegar, A. J. Batchelor, A. F. Brice and J. H. Johnson.

TORONTO, O.—The American Electric Co. has purchased a 42-acre site and will build a plant to manufacture electric specialties.

WARREN, O.—The Warren Iron & Steel Co. is reported planning to enlarge its plant.

WARREN, O.—The Borden Machine Co. contemplates an extension to its plant, two stories, 30 x 124 feet.

WILMINGTON, O.—The Wilmington Casting Co. plans the erection of a plant addition, 70 x 180 feet, to be built at an estimated cost of $30,000.

WILMINGTON, O.—The Irwin Auger Bit Co. plans the erection of a forging shop, 1 story, 60 x 120 feet, to be built at an estimated cost of $25,000.

WOOSTER, O.—The Woodward Machine Co. will build an addition to its forge shop.

WOOSTER, O.—The Akron Brass Mfg. Co. plans a machine shop, 1-story, 40 x 185 feet.

YOUNGSTOWN, O.—The Federal Iron Works Co. recently was incorporated with a capital of $25,000, by F. J. McCarthy, J. H. Flood, J. S. Siegle, J. J. McConoville and F. C. Dustman.

BELLE, W. VA.—O. J. Dorsey is president of the Carter Coal & Mining Co. which will install additional equipment to increase its output.

CHARLESTON, W. VA.—The Rollin Chemical Corp. will begin work shortly rebuild its plant, recently damaged by fire.

CLARKSBURG, W. VA.—The Phelps Can Co. of Baltimore and Weirton, W. Va., plans a branch plant here.

CLARKSBURG, W. VA.—The General Equipment Co. has been incorporated with a capital of $25,000, by W. B. Horner, J. H. Davis and Leo P. Caulfield, to manufacture mining and construction machinery and equipment.

FAIRMOUNT, W. VA.—The Colborn Safety Device Co. has been incorporated with a capital of $100,000, by George T. Watson, W. D. Stockly, J. C. Evans, J. F. Hunsaker and others.

FAIRMONT, W. VA.—The Fairmont Enameled Ware Co. has been incorporated with a capital stock of $25,000 by W. H. Finley, Carl Riggs and Frederick D. Cook.

FAIRMONT, W. VA.—The Colborn Safety Device Co. has been incorporated with a capital of $100,000 by W. D. Stockley, G. T. Watson and J. E. Evans to manufacture safety appliances, automatic cut-off devices, etc.

HUNTINGTON, W. VA.—The Fulton Tool Works plans the erection of two 1-story additions, to cost about $35,000.

HUNTINGTON, W. VA.—The Winner Gas Stove Co. has been incorporated with a capital of $50,000, by J. T. Masterson, H. C. Daniels and others to manufacture gas stoves and equipment.

MANNINGTON, W. VA.—The Mannington Boiler Works plans the erection of a new plant.

MANNINGTON, W. VA.—The Charles Phillips Tool Co. has completed plans for a 1-story machine shop.

MARTINSBURG, W. VA.—An electric power plant to cost approximately $100,000 will be erected by the Interwoven Mills, Inc. Headquarters of the company are at New Brunswick, N. J.

Throughout the West

ST. LOUIS.—The St. Louis Malleable Castings Co. has broken ground for the erection of two plant buildings.

ST. LOUIS.—The Frank Adams Electric Co., Frank Adams president, is building a 1-story plant, 145 x 190 feet, costing $75,000.

ST. LOUIS.—The Hagen Metal Products Co., Detroit, is building a 1-story plant, 40 x 140 feet, costing $10,000.

ST. LOUIS.—The Brecht Co., 1201 Cass avenue, is building a 2-story machine shop, 107 x 130 feet, costing $50,000.

STUTTGART, ARK.—The American Tractor & Harvester Co. will equip a plant at an estimated cost of $100,000.

BRECKENRIDGE, TEX.—The Dunigan Tool & Supply Co. has been incorporated with a capital stock of $125,000, by J. B. Dunigan, T. J. Hinerman and E. W. Biset.

FT. WORTH, TEX.—The Midland Brass Works has been incorporated with a capital of $25,000, by J. L. Boicourt, Arthur D. Modgson and W. B. Sloan.

MCKINNEY, TEX.—The Sunlite Co., manufacturer of automobile lamps, is preparing to build a 1-story plant costing $100,000. E. R. Brackett is engineer.

PORT NECHES, TEX.—The Hydraulic Machinery Mfg. Co. is building three 1-story structures, each 60 x 140 feet, for foundry and machine shops and sheet working, at a cost of $75,000. Clayton F. Holmes is manager.

EL RENO, OKLA.—The Timpkins Motor Co. has plans for the erection of a 2-story machine shop, 50 x 108 feet.

CENTRALIA, WASH.—The Kane Pneumatic Shock Absorber Co. will erect an additional plant.

OLYMPIA, WASH.—The Bayside Iron Works recently was incorporated with a capital stock of $100,000, by C. J. Witney, G. W. Munaw and others.

TACOMA, WASH.—The Griffin Wheel Co. has awarded contracts for new buildings at its plant to cost $100,000.

PORTLAND, OREG.—The Specialty Foundry & Machine Works has plans for an addition.

PORTLAND, OREG.—The Albina Marine Works has been incorporated with $50,000 capital, by William Cornfoot, George Rogers and George Pinketh to manufacture and repair boilers.

PORTLAND, OREG.—The Specialty Foundry & Machine Works has had plans prepared for the erection of an addition to its plant to be built at an estimated cost of $5000. New machinery will be purchased.

ALAMEDA, CAL.—The Metal Trades Foundry Corp., Oak and Clement streets, plans a plant addition.

BERKELEY, CAL.—The University Apparatus Co., 2229 McGee street, manufacturer of laboratory apparatus, will build a plant at a cost of $16,000.

LONG BEACH, CAL.—The Western Machine & Mfg. Co. has been incorporated with a capital of $25,000, by M. O. Harvey and others.

LOS ANGELES.—The Boxxani & Davies Machine Shop Co., 411 Sunset boulevard, has been organized by David Davies and others.

LOS ANGELES.—The Quality Foundry & Mfg. Co. has been incorporated with a capital of $20,000, by Robert J. Schefferly and others.

LOS ANGELES.—The Economic Tool Co., 1032 South Grand avenue, has been organized to manufacture tools, by E. O. Myers and others.

LOS ANGELES.—The Los Angeles Gas & Electric Corp. is issuing $1,000,000 in bonds to provide for a steel structure and additional equipment.

Business in Canada

LACHINE, QUE.—The Rapid Tool & Machine Co., Ltd., has been incorporated to manufacture gages, tools, etc., with a capital of $500,000, by John MacNaughton, Robert Dodd, James G. Cartwright and others.

MONTREAL, QUE.—The James Smart Mfg. Co. has been incorporated to manufacture machinery, etc., with $2,000,000 capital, by Francis G. Bush, George R. Drennan, Herbert W. Jackson and others.

MONTREAL, QUE.—The Dominion Bridge Co., Lachine, Que., has the contract by the Montreal Tramways Co., 78 Craig street west, for a substation here to cost $75,000.

MONTREAL, QUE.—The Montreal Stencil Works, Ltd., has been incorporated to manufacture stamps, seals, metal products, etc., with a capital of $100,000, by Maurice Dugas, S. H. R. Bush, Benjamin Robinson and others.

MONTREAL, QUE.—The P. H. Murphy Co. of Canada, Ltd., has been incorporated to manufacture railway cars, machinery, etc., with a capital of $500,000, by Waldo W. Skinner, George H. Hyde, Ronald C. Grant and others.

SHERBROOKE, QUE.—The Sherbrooke Machinery Co., Randrell street, has let the contract for an addition to its machine shop to cost $26,000.

BELLEVILLE, ONT.—The Springer Lock Mfg. Co., 180 Coleman street, is having plans prepared for a manufacturing plant.

FERGUS, ONT.—Beatty Bros., stable equipment, pumps, etc., recently increased capital from $750,000 to $2,000,000 in order to provide capital to take

care of increased business The company will spend $150,000 this year on extensions.

GALT, ONT.—The Elliott & Whitehall Machine & Tool Co. will erect a manufacturing plant.

GALT, ONT.—The Galt Brass Co. has been incorporated to take over the plant and business of the Galt Brass Co., Ltd., with $550,000 capital. Arthur W. Holmsyed, room 43, King street, and others are interested.

GUELPH, ONT.—The R. E. Christie Electric Co., Ltd., has been incorporated to manufacture motors, etc., with $40,000 capital, by Reuben E. Christie, Victor J. Hurley and others.

LEASIDE, ONT.—The Canada Wire & Cable Co., Ltd., decided some time ago to establish an enameled copper wire department in connection with its plant.

OJIBWAY, ONT.—The Canadian Steel Corp. is proceeding with the erection of a wire plant here.

OTTAWA, ONT.—The Plant Carriage Works, Murray street, manager, Frank Plant, will build an addition.

PARIS, ONT.—The G. W. MacFarlane Engineering, Ltd., has been incorporated to manufacture iron, etc., with $500,000 capital, by George W. MacFarlane, Paris, Ont.; Edward H. Ambrose and John R. Marshall of Hamilton, Ont.

PETERBORO, ONT.—The city will appoint an architect to prepare plans for a sewage disposal and pumping plant.

PETROLIA, ONT.—The Draper Mfg. Co., Port Huron, Mich., announce that it will reopen and extend its plant here.

PORT ARTHUR, ONT.—The Atlas Mfg. Co., electrical supplies and equipment, has purchased a site on Ambrose street. There is now a building on the site which will be remodeled, and in addition to this the company will erect a 4-story factory to be equipped with the most modern machinery.

ST. CATHERINES, ONT.—F. W. Wilson, care of Lincoln Construction Co., Niagara street, has the general contract for a factory here for the Ajax Wire Wheel Corp. of America, New York.

TORONTO, ONT.—Booth-Coulter Copper & Brass Co., 115 Sumach street, have let the contract for factory addition.

Business Changes Recently Announced by the Trade

HENRY J. RIVOIRE, New York, announces that the incorporation of his business henceforth will be known as Henry J. Rivoire & Co., Inc., and the business has been moved from 15 Whitehall street, to 293 Broadway, New York.

* * *

The Newton Steel Co., Newton Falls, O., has opened an office in Chicago, located in the Peoples Gas building, in charge of J. L. Harrison.

* * *

The Wayne Machinery Co., Ft. Wayne, Ind., has opened a display room at 121 South Third street, Louisville, Ky., in charge of L. Kenner.

* * *

The Page Steel & Wire Co. recently moved its central district sales office from 29 South La Saile street to 208 South La Salle street, Chicago.

* * *

T. P. Walls Tool & Supply Co., Inc., has moved its business from 75 Walker street to 25 Leonard street, New York, where its offices as well as warerooms will be quartered.

* * *

In order that its name will be more in accordance with the nature of its business, the Detroit Tool Co., Detrot, has changed its name to the Detroit Machine Tool Co.

* * *

The Automotive Engine Parts Co., Detroit, distributor for Continental motors and Borg & Beck clutch parts, has taken temporary quarters at 49 Selden avenue. D. W. Burke is president and W. J. Burns treasurer.

* * *

Offices and warehouses of the E. B. Stickley Machinery Co., Detroit, have been combined in a new building at 217 Congress street, east. The company deals in new and used metalworking machinery.

* * *

The Phoenix Iron Co. has changed its New York City office address from 49 Williams street to 132 Nassau street. No one has been appointed manager to succeed the late Daniel Sissions as yet.

* * *

Executive offices of the Pittsburgh Crucible Steel Co., a subsidiary of the Crucible Steel Co. of America, Pittsburgh, have been removed from the Empire building to the Oliver building, Pittsburgh.

* * *

The Lycoming Foundry & Machine Co., Williamsport, Pa., has changed its corporate name to the Lycoming Motors Corp., and will continue the manufacture of automobile motors with no change in its personnel.

* * *

The Booth Electric Furnace Co. has removed its executive and sales offices from 53 West Jackson boulevard, Chicago, to the engineering and production office, which has been located at 326 West Madison street, that city.

* * *

The Illinois Tool Works, 154 East Erie street, Chicago, has taken a 5-year lease on a 6-story building at Erie and St. Clair streets, Chicago, which it will utilize for general offices, sales rooms and manufacturing plant.

* * *

The Falls Hollow Staybolt Co., Cuyahoga Falls, O., announces the appointment of the Federal Sales Corp., J. C. Lappe, president, Conestoga building, Pittsburgh, as its exclusive sales agent in eastern Ohio, western Pennsylvania and West Virginia.

* * *

The George T. Ladd Co., Pittsburgh, manufacturer of water tube boilers, has opened a Chicago district sales office at 528 McCormick building, Chicago, in charge of W. M. McKinstrey, formerly Chicago district manager for the Page Boiler Co.

* * *

The name of the Lapeer Tractor-Truck Co., Mich., recently was changed to the Lapeer trailer Corp., in view of its discontinuance of the manufacture of tractors, and the devotion of all its manufacturing facilities to the building of trailers.

* * *

The Williams Tool Corp., Erie, Pa., has acquired control of John H. Hall & Sons, Ltd., Brantford, Ont., the only Canadian company engaged exclusively in the manufacture of pipe-threading machines. Canadian and British markets will be served from the Hall plant.

* * *

M. Samuels & Co., Ltd., 25-27 Bishops Gate, London, Eng., have been appointed general representatives in England for the Foundry Equipment Export Co., New York. Alba B. Johnson Jr., manager of the corporation, is now in England and is making his headquarters with the Samuels company.

* * *

Don F. Kennedy, metallurgist and manufacturers' agent, has moved from 1257 David Whitney building, Detroit, to larger quarters at 736-738 the same building. Among the accounts which he handles are those of the Union Electric Steel Co., Pittsburgh, and the Towmotor Co., Cleveland.

Iron and Steel Scrap Prices

Corrected to Tuesday Noon — **Gross Tons Delivered to Consumer**

Steel Works Scrap

HEAVY MELTING STEEL

Pittsburgh	$25.00 to 26.00
Chicago	22.50 to 23.00
Eastern Pennsylvania	22.50 to 23.50
Cleveland	23.75 to 24.00
St. Louis	22.50 to 23.00
Buffalo	24.50 to 25.00
New York (dealers)	19.50 to 20.00
Birmingham	20.00 to 21.00
Cincinnati	23.50 to 24.50
Valleys	25.00 to 25.25
Boston (dealers)	19.50 to 20.00
Detroit	20.50 to 21.00

BUNDLED SHEETS

Pittsburgh	$15.00 to 15.50
Eastern Pennsylvania	19.00 to 19.50
Cleveland	14.50 to 15.00
Buffalo	16.50 to 17.50
Cincinnati	16.50 to 17.50
St. Louis	13.00 to 13.50

STEEL RAILS, SHORT

Chicago	27.00 to 27.50
Boston (dealers)	21.00 to 22.00
Cleveland	22.00 to 22.50
St. Louis	24.00 to 24.50
Birmingham	22.00 to 23.00
Cincinnati	23.00 to 24.00

STOVE PLATE

Pittsburgh	$29.00 to 30.00
Chicago	32.50 to 33.00
Eastern Pennsylvania	28.50 to 29.50
Cleveland	30.00 to 31.00
Detroit	30.50 to 31.00
St. Louis	30.00 to 35.50
Buffalo	31.50 to 32.50
New York	27.50 to 28.00
Birmingham	28.00 to 30.00
Cincinnati	28.00 to 28.50
Boston (consumers)	30.00 to 30.50

LOW PHOSPHORUS

Pittsburgh, billet and bloom crops	$31.00 to 32.00
Chicago, billet and bloom crops	24.00 to 25.00
Eastern Penn. (guaranteed)	31.00 to 32.00
Buffalo	31.50 to 32.50

SHOVELING STEEL

Chicago	22.00 to 22.50
St. Louis	21.50 to 22.00

KNUCKLES, COUPLERS AND SPRINGS

Pittsburgh	$26.00 to 27.00
Chicago	25.00 to 25.50
St. Louis	24.00 to 24.50

BALED SHEETS

Pittsburgh	$21.00 to 22.00
Chicago	17.50 to 18.00
Detroit	18.50 to 19.00

FROGS, SWITCHES, GUARDS

Chicago	$22.50 to 23.00
St. Louis	22.00 to 22.50
Eastern Pennsylvania	22.50 to 23.50

BOILER PLATE, CUT

Chicago, No. 1	$19.50 to 20.00
St. Louis	16.00 to 16.50

ANGLE BARS—STEEL

Chicago	$25.00 to 25.50
St. Louis	22.00 to 22.50

Iron Mill Scrap

RAILROAD WROUGHT

Pittsburgh, No. 1	$31.00 to 32.00
Pittsburgh, No. 2	25.00 to 26.00
Chicago, No. 1	28.75 to 29.75
Chicago, No. 2	26.50 to 27.00
Eastern Pennsylvania No. 1	34.00 to 35.00
Cleveland, No. 1	29.00 to 29.50
St. Louis, No. 1	27.50 to 28.00
St. Louis, No. 2	25.00 to 25.50
Buffalo	30.50 to 31.50
Cincinnati	29.50 to 30.00
Birmingham, No. 1	23.00 to 25.00
New York, No. 1 (dealers)	30.00 to 31.00
Boston (dealers)	27.50 to 28.00

WROUGHT PIPE

Eastern Pennsylvania	$23.00 to 24.00
Buffalo	20.50 to 21.50
New York (dealers)	19.50 to 20.00
Boston (dealers)	19.00 to 20.00

YARD WROUGHT

Eastern Pennsylvania, No. 1	$29.00 to 30.00

CITY WROUGHT

New York, long (dealers)	$23.00 to 23.50

BUSHELING

Chicago, No. 1	$20.75 to 21.25
Chicago, No. 2	15.25 to 15.75
Cleveland, No. 1	18.75 to 19.25
Cleveland, No. 2	16.00 to 16.25
St. Louis, No. 1	18.50 to 19.00
Buffalo, No. 1	19.50 to 21.00
Cincinnati, No. 1	20.50 to 21.50
Eastern Pennsylvania, No. 1	19.00 to 20.00

MACHINE SHOP TURNINGS

Pittsburgh	$15.50 to 16.00
Chicago	13.50 to 14.00
Eastern Pennsylvania	18.00 to 19.00
Cleveland	13.00 to 13.50
Buffalo	16.00 to 16.50
New York (dealers)	16.00 to 16.50
St. Louis	14.00 to 14.50
Detroit	11.50 to 12.00
Cincinnati	14.00 to 14.50
Birmingham	13.00 to 15.00
Valleys	14.00 to 14.50
Boston (dealers)	14.00 to 15.00

CAST IRON BORINGS

Pittsburgh	$18.50 to 19.00
Chicago	12.00 to 12.50
Eastern Pennsylvania	20.00 to 21.00
Eastern Pennsylvania (chemical)	22.50 to 25.50
Cleveland	17.00 to 17.25
St. Louis	15.00 to 15.50
Detroit	16.00 to 16.50
Buffalo	16.50 to 17.50
New York (dealers' price)	17.00 to 17.50
Cincinnati	15.00 to 16.00
Birmingham	13.00 to 15.00
Valleys	18.25 to 18.50
Boston (dealers)	16.00 to 16.50

MIXED BORINGS AND TURNINGS
(For blast furnace use)

Eastern Pennsylvania	$17.50 to 18.50
Boston (dealers)	14.00 to 15.00

IRON AXLES

Pittsburgh	$42.00 to 43.00
New York (dealers)	46.00 to 47.00
Chicago	44.50 to 45.00
Eastern Pennsylvania	45.00 to 46.00
Detroit	41.00 to 42.00
Cleveland	42.50 to 43.00
St. Louis	43.00 to 43.50
Buffalo	39.00
Cincinnati	36.00 to 37.00
Birmingham	30.00 to 31.00

IRON RAILS

Chicago	$34.50 to 35.50
Cleveland	29.50 to 30.50
St. Louis	31.50 to 32.00
Buffalo	28.00 to 29.00
Cincinnati	26.00 to 27.00

PIPES AND FLUES

Chicago	$17.50 to 18.00
Cleveland	19.00 to 19.50
St. Louis	17.00 to 17.50
Cincinnati	21.00 to 21.50

GRATE BARS

Chicago	$32.50 to 33.00
Cleveland	30.00 to 31.00
Detroit	22.50 to 23.50
Buffalo	23.50 to 24.50
New York	26.00 to 27.00
Eastern Pennsylvania	29.00 to 30.00

FORGE FLASHINGS

Cleveland, large	$17.25 to 17.50
Chicago, small	18.00 to 18.50
Cleveland, small	18.50 to 19.00
Boston (dealers)	14.00 to 15.00

FORGE SCRAP

Chicago	$26.50 to 27.00
Eastern Pennsylvania, No. 1	19.00 to 19.50
Boston	14.00 to 15.00

ARCH BARS AND TRANSOMS

Chicago	$36.00 to 36.50
St. Louis	32.00 to 32.50

ANGLE BARS—IRON

Chicago	$35.00 to 35.50
St. Louis	29.00 to 29.50

Iron and Steel Works Scrap

AXLE TURNINGS

Pittsburgh	$22.00 to 23.00
Eastern Pennsylvania	21.00 to 22.00
Boston (dealers)	15.00 to 16.00
St. Louis	16.00 to 16.50
Detroit	$16.50 to 16.50
Cleveland	19.50 to 19.75
Buffalo	19.50 to 20.50
Chicago	19.50 to 20.00

STEEL CAR AXLES

Pittsburgh	$33.00 to 34.00
Eastern Pennsylvania	40.00
Cleveland	33.00 to 34.00
St. Louis	35.00 to 35.50
Buffalo	39.00
Chicago	37.00 to 37.50
New York (dealers)	41.00 to 42.00
Birmingham	30.00 to 31.00
Boston (dealers)	36.00 to 36.50
Detroit	32.50 to 33.00

SHAFTING

Eastern Pennsylvania	34.00 to 35.00
St. Louis	32.00 to 32.50
New York (dealers)	29.00 to 30.00
Chicago	35.50 to 36.00

Iron Foundry Scrap

CAR WHEELS

Pittsburgh, iron	$39.00 to 40.00
Pittsburgh, steel	26.000 to 27.00
Chicago, iron	37.50 to 38.00
Eastern Pennsylvania, iron	39.00 to 41.00
Cleveland, iron	33.50 to 34.50
St. Louis, iron	35.50 to 36.00
Buffalo, iron	37.00 to 38.00
Birmingham, iron	29.00 to 31.00
Birmingham, tram car	30.00 to 31.00
Boston (consumers)	39.00 to 40.00
Cincinnati	30.00 to 31.00
New York, iron	37.00 to 38.00
Detroit	33.00 to 34.00

NO. 1 CAST SCRAP

Pittsburgh, cupola	$38.00 to 40.00
Chicago, cupola	42.50 to 43.00
Eastern Pennsylvania, cupola	38.00 to 40.00
Cleveland, cupola	39.00 to 40.00
New York, cupola (dealers)	37.00 to 38.00
Cincinnati, No. 1, machinery, cupola (net)	34.00 to 35.00
Detroit	31.50 to 32.50
Birmingham, cupola	30.00 to 33.00
St. Louis, railroad	37.00 to 37.50
St. Louis, agricultural	36.00 to 36.50
Buffalo	37.00 to 38.00
Boston (consumers)	42.00 to 43.00
Valleys	38.00 to 39.00

HEAVY CAST

New York (dealers)	$35.50 to 36.50
Buffalo	27.00 to 28.00
Pittsburgh	31.00 to 32.00
Cleveland	28.00 to 28.50
Boston (consumers)	34.00 to 35.00

MALLEABLE

Pittsburgh, railroad	$30.00 to 31.00
Pittsburgh, agricultural	27.00 to 28.00
Chicago, railroad	29.00 to 29.50
Chicago, agricultural	29.00 to 29.50
Eastern Pennsylvania, railroad	28.00 to 29.00
Cleveland railroad	31.50 to 32.00
Cleveland, agricultural	26.50 to 27.00
St. Louis, railroad	26.00 to 26.50
St. Louis, agricultural	25.00 to 25.50
Cincinnati, railroad	29.00
Cincinnati, agricultural	28.00 to 29.00
Boston, railroad	27.50 to 28.50
Buffalo	30.50 to 31.50

Miscellaneous Scrap

REROLLING RAILS
5 feet and over

Pittsburgh district	$31.00 to 32.00
Chicago	31.50 to 32.00
Eastern Pennsylvania	31.00 to 33.00
Cleveland	31.00 to 31.50
St. Louis	31.50 to 32.00
Birmingham	31.00 to 32.00
Boston (dealers)	29.00 to 30.00
Detroit	28.00 to 29.00

LOCOMOTIVE TIRES

Chicago	$27.00 to 27.50
St. Louis	23.00 to 23.50

BOILER PUNCHINGS

Chicago	27.00 to 27.50
Eastern Pennsylvania	29.00 to 30.00

FERRO ALLOYS

INTRODUCING MR. W. K. KENLY

To the Trade

We take pleasure in announcing that Mr Kenly formerly Purchasing Agent of the ~~Interstate Iron & Steel~~ Co Chicago has associated himself with us and will be in full charge of our Ferro Alloys Department

Trusting to be favored with your inquiries which will have our best attention we are

Yours very truly
The J. L. Miller Co
Jos Miller
Pres

McCormick Bldg
Chicago Ill

CHROME
SILICON
NICKEL
VANADIUM
PIG IRON
FUEL OIL

MANGANESE
SPIEGELEISEN
FLUOR SPAR
ALUMINUM
BABBITT
STEEL SCRAP

"MILLCO" SERVICE

New Trade Publications

STEAM REGULATION.—The Hagan Corp., Pittsburgh, has published a folder containing various data pertaining to the loss of fuel energy due to poor boiler regulation.

ELECTRIC TOOLS—A new general catalog describing and illustrating electrical tools and appliances manufactured by the Wisconsin Electric Co., Inc., Racine, Wis., has just been published.

FLEXIBLE ARM.—The Breese Mfg. Co., Newark, N. J., has issued a folder in which a flexible metal arm for electric light fixtures is described and illustrated. This arm directs the light to the spot where it is required. Construction details and other data are given.

SANDBLAST.—A condensed catalog written in Italian has been published by the Pangborn Corp., Hagerstown, Md., for distribution abroad. The various types of sandblast and allied equipment manufactured by the company are described and illustrated.

TOOLS AND SUPPLIES—Peter A. Frasse & Co. Inc., 417 Canal street, New York, is printing an 800-page, cloth-bound general catalog of tools, machinery and supplies which soon will be ready for distribution. The contents are arranged in sections as follows: "Tool and Alloy Steels"; "Seamless Steel Tubes"; "Transmission Chains"; "Machinists Tools and General Supplies"; "Machinery," etc.

BRASS FOUNDRIES.—The S. Obermayer Co., Chicago, has issued a special catalog, a booklet of 112 pages, which is devoted exclusively to the requirements of brass and aluminum foundries. This catalog is complete in every detail and for the convenience of the foundryman, is divided into four sections: Melting, molding room, core room, cleaning and finishing room.

CENTRIFUGAL PUMPS.—Pumps for sugar house service are described in a bulletin recently issued by the De Laval Steam Turbine Co., Trenton, N. J. According to the booklet the only parts subject to wear by rubbing in these centrifugal pumps are the bearings, the lubrication of which is automatic. The booklet also states that these pumps require but little attention and inspection can be easily made.

WIRE.—The Page Steel & Wire Co. has published a pamphlet in which the electrical and physical properties of ingot iron wire, are described. This is said to be the first complete publication of this data and the result of many tests made during the past two years under the supervision of the electrical testing laboratory, New York, and Frank F. Fowle, consulting electrical engineer, for the company, are given.

DECK TABLES.—A bulletin describing and illustrating diagonal deck tables is being circulated by the Deister Concentrator Co., Ft. Wayne, Ind. A number of improvements have been made in these tables, all of which are pointed out in the booklet. The improvements include the introduction of running-in-oil head motions, which are described on pages 7 and 9, and cuts show both the old and new style.

CENTRIFUGAL PUMPS.—Centrifugal pumps of the single-stage and multi-stage types for various service, are described and illustrated in a booklet recently issued by the De Laval Steam Turbine Co., Trenton, N. J. The booklet contains complete details, and explains fully the use of pump characteristic curves in adapting pumps to various services, the adaption of centrifugal pumps to different types of drives, and information required by the manufacturer in order to design a pump to suit conditions, etc. Formulae and tables are given for calculating horsepower, efficiencies, the readings of meters, friction in pipe lines, etc.

INDUSTRIAL TRUCKS.—The Stuebing Truck Co., Cincinnati, is distributing a carboard folder, in which various data pertaining to the efficient operation of industrial trucks are given. A description of the trucks is given.

CONCRETE CONSTRUCTION.—A cardboard folder has been published by the Turner Construction Co., New York, showing a group of buildings of all types and for various purposes, which it built in 1919. The folder also gives a summary of the work done by the company in 1919.

BELTING.—The Graton & Knight Mfg. Co., Worcester, Mass., has published a 38-page booklet in which various data pertaining to leather belting are given. This includes, history and advantages of standardization as regards leather belting. The booklet also contains tables of belting standards for various industries, mechanical rules regarding belting, etc.

WATER.—Equipment, such as pumps and water fittings, are described and illustrated in a booklet recently published by the Humphryes Mfg. Co., Mansfield, O. One section of the booklet contains a number of interesting tables, included in which is the cost of pumping, and the weight of liquids lighter and heavier than water, as well as a practical suction lift table.

AERIAL RAILWAY.—The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., is circulating a booklet in which electric monorail hoists are described and illustrated. These hoists consist of an electric hoist and cage suspended from trolleys traveling a single I-beam and are operated by electricity. They can be run in either direction at various ranges of speed. In the booklet the plans of two typical installations are shown, with photographs of the machines at work. Each of the several types of hoists manufactured are illustrated, with detail drawings and in addition specifications of parts are given, while switches, tractage and conductor material are explained and illustrated.

HEAT TREATMENT.—A pamphlet entitled *The Hump Method for the Heat Treatment of Steel*, has been issued by the Leeds & Northrup Co., Philadelphia, in which a new method of hardening steel is described. Accurate measurement of temperatures and the independent determination of transformation points are rendered unnecessary with this method, according to the booklet. The work is heated in an electric furnace in contact with or near a thermocouple. A recording instrument draws upon a large scale chart a curve of the electromotive force developed by the thermocouple. While the work is passing through the transformation or decalescence point, the rise in temperature is arrested producing a jog or "hump" in the line. The operator allows the work to remain in the furnace a definite number of minutes after this jog appears and then quenches. The results claimed are entire uniformity of heat treatment, including grain size, hardness and tensile strength, with freedom from distortion, breakage, decarbonization and scale. The method and apparatus was described fully on pages 630 and 631 of the Feb. 26 issue of THE IRON TRADE REVIEW.

Opportunities Abroad

Requests for information should be forwarded to district or co-operative office in your district, of the Bureau of Foreign and Domestic Commerce. Each request should be on a separate sheet and be accompanied by the opportunity number

DISTRICT OFFICES

New York, 734 Customhouse; Boston, 1801 Customhouse; Chicago, 504 Federal bldg.; St. Louis, 402 Third Nat'l Bank; New Orleans, Hibernia Bank; Seattle, Henry bldg.; San Francisco, 307 Customhouse

CO-OPERATIVE OFFICES

Cleveland, Chamber of Commerce; Cincinnati, Chamber of Commerce; Los Angeles, Chamber of Commerce; Philadelphia, Chamber of Commerce; Portland, Oreg., Chamber of Commerce; Dayton, Ohio, Chamber of Commerce; Pittsburgh, Chamber of Commerce

A commercial agent in Australia desires an agency for the sale of farm tractors, road tractors, portable railways, etc. Opportunity No. 32800.

A land owner in Syria desires catalogs from manufacturers and exporters of all kinds of motor-driven agricultural machinery and implements. Opportunity No. 32802.

An inquirer in France desires to be placed in communication with manufacturers of machines for opening envelopes, machines for folding letters, etc. Opportunity No. 32809.

A merchant in Mexico desires to purchase one carload of galvanized ware in the form of washtubs and buckets in all sizes. Opportunity No. 32812.

A firm of importers in Bulgaria desires to purchase and secure an agency for the sale of construction material, such as nails, all kinds of iron, rods, zinc plates and galvanized sheets, iron beams, etc. Opportunity No. 32815.

The representative of a firm in Australia is about to visit the United States and desires an agency on a commission basis, for the sale of aluminum household utensils, sheet aluminum, etc. Opportunity No. 32817.

An ore smelting company in Mexico desires to purchase machinery for concentrating zinc blend ore. Opportunity No. 32823.

A manufacturer in England desires to purchase tinned mattress wire. Opportunity No. 32827.

A merchant firm in Brazil desires to purchase and secure an agency for hardware, ironware, electrical fittings, etc.; sugar mill machinery, agricultural machinery, etc. Opportunity No. 32829.

A firm of merchants in Brazil desires to purchase and secure an agency for galvanized corrugated iron sheets, etc. Opportunity No. 32842.

An engineering firm in England desires to secure an agency for the sale of materials such as metal products, tubes and fittings, etc. Opportunity No. 32843.

A merchant in Canada desires to purchase molders' tools. Opportunity No. 32845.

A manufacturing firm in France desires to purchase 500 boxes of tin plate, 112 sheets to the box. Opportunity No. 32847.

Do You Believe—

THAT National Prosperity Rests on Foreign Trade?

America's Foreign Trade in 1919 was valued at Twelve Billion Dollars. Increased productive capacity has probably gone ahead of consumptive capacity. New consumers must be found abroad.

THAT Foreign Trade Rests on a Merchant Marine?

England always imported more than she exported but her wealth increased. Her "invisible exports", that is, the freight she earned carrying other nations' goods, offset the drift of trade against her and made her the world's banker.

THAT a Merchant Marine is a Big, Permanent Consumer of Your Products?

A ship is man's highest development,—freight carrier, hotel, power plant, combined in one swift traveling unit. Construction costs are only one item in the long record of expense during a ship's life. America's new commercial fleet cost $3,000,000,000. To keep this fleet in service will cost half as much as our present national debt.

The Annual Operating Number of MARINE REVIEW sums up the World's progress in ship operation for the past year. Devoted entirely to the interests and problems of shipping executives, who direct this huge business.

The Annual Operating Number has permanent business use. It is filed and referred to many times until the next Annual is issued.

The Annual will reach 10,000 executives in the marine field here and abroad. The edition of last year's Annual was exhausted three weeks after publication.

Forms close June 5. **Rates on Request.**

Reserve Space Now!

MARINE REVIEW

Penton Building **Cleveland, Ohio**

Iron and Steel Prices

Iron Ore

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 per cent iron	$7.45
Mesabi Bessemer, 55 per cent iron	7.20
Old range nonbessemer, 51½ per cent iron	6.70
Mesabi nonbessemer, 51½ per cent iron	6.55

Port Henry Iron Ore, f.o.b. Port Henry

Old bed 21 furnace	$5.80
Old bed concentrates, 63 per cent	6.70
Harmony, cobbed, 63 per cent	6.70
New bed, low phos., 65 per cent	9.50
Lump ore for fix	7.00

Manganese Ore

Brazilian, 45 to 50 per cent, c.i.f. Atlantic ports, 70 to 85 cents per unit, nominal.

Indian, 70 to 80 cents per unit, c.i.f. Atlantic ports, 70 to 85 cents per unit.

Caucasian, 48 to 50 per cent, f.o.b. cars, Atlantic ports, 60 to 85 cents per unit, nominal.

GRAVEL FLUOR SPAR

85 per cent f.o.b. Kentucky and Illinois, per ton $25.00

Warehouse Prices

Steel bars, Boston	5.50c
Steel bars, Chicago	3.37c to 3.87c
Steel bars, Cleveland	3.37c to 6.00c
Steel bars, Detroit	4.485c
Steel bars, Philadelphia	5.00c
Steel bars, Phila., ⅜ inch and smaller	6.00c to 10.00c
Steel bars, New York	3.37c to 4.75c
Steel bars, St. Louis	3.94c to 4.50c
Steel bars, Cincinnati	5.00c
Steel bars, St. Paul	3.59c to 4.095c
Steel bars, Buffalo	4.50c
Iron bars, Boston	5.50c
Iron bars, Buffalo	5.26c
Iron bars, Chicago	3.37c to 4.50c
Iron bars, Detroit	4.485c
Iron bars, St. Louis	4.50c
Iron bars, Cincinnati	4.50c
Iron bars, Philadelphia	5.00c
Iron bars, New York	4.25c to 4.50c
Shapes, Chicago	3.47c to 3.97c
Shapes, Detroit	4.335c
Shapes, Boston	5.50c
Shapes, St. Louis	4.04c
Shapes, St. Paul	3.695c to 4.195c
Shapes, New York	3.47c to 4.75c
Shapes, Cleveland	3.37c to 5.50c
Shapes, Philadelphia	4.50c
Shapes, Phila., 2-inch and smaller	5.00c
Shapes, Buffalo	4.41c
Shapes, Cincinnati	4.25c
Plates, Buffalo	4.61c
Plates, Chicago	3.67c to 4.17c
Plates, Detroit	4.535c
Plates, Boston	6.00c
Plates, St. Louis	4.24c
Plates, St. Paul	3.895c to 4.395c
Plates, New York	3.67c to 5.00c
Plates, Cleveland	3.57c to 5.50c
Plates, Phila., ¼-inch and heavier	5.50c
Plates, Phila., ⅜-inch	6.00c
Plates, Cincinnati	6.00c
No. 10 blue anl. sheets, N. Y.	7.12c to 8.50c
No. 10 blue anl. sheets, Phila.	7.00c
No. 10 blue anl. sheets, Chicago	4.57c to 7.02c
No. 10 blue anl. sheets, Cleveland	6.75c to 8.10c
No. 10 blue anl. sheets, Boston	8.00c
No. 10 blue anl. sheets, Buffalo	6.51c
No. 10 blue anl. sheets, Detroit	7.50c
No. 10 blue anl. sheets, St. L.	7.00c to 7.09c
No. 10 blue anl. sheets, Cincinnati	7.00c
No. 10 blue anl. sheets, St. Paul	4.70c to 7.225c
No. 10 blue anl. sheets, Boston	8.00c
No. 28 black sheets, Chicago	5.62c to 8.00c
No. 28 black sheets, New York	8.50c to 10.00c
No. 28 black sheets, Phila.	8.00c
No. 28 black sheets, Cleveland	6.75c to 8.90c
No. 28 black sheets, Boston	9.15c
No. 28 black sheets, Cincinnati	8.50c to 9.00c
No. 28 black sheets, Detroit	8.50c
No. 28 black sheets, St. Louis	8.10c
No. 28 black sheets, St. Paul	5.845c to 8.225c
No. 28 black sheets, Buffalo	8.25c
No. 28 galv. sheets, Chicago	9.50c
No. 28 galv. sheets, New York	9.75c to 11.00c
No. 28 galv. sheets, Phila.	10.00c to 10.50c
No. 28 galv. sheets, Boston	10.50c
No. 28 galv. sheets, Cleveland	9.00c to 10.00c
No. 28 galv. sheets, Cincinnati	8.50c to 9.00c
No. 28 galv. sheets, Detroit	10.00c
No. 28 galv. sheets, Buffalo	9.50c
No. 28 galv. sheets, St. Louis	9.80 to 10.00c
Bands, New York	5.82c to 6.50c
Bands, Boston	7.25c
Bands, Detroit	5.685c
Bands, Buffalo	5.76c
Hoops, Buffalo	6.01c
Hoops, Boston	8.25c
Hoops, New York	6.07c
Hoops, Detroit	5.935c
Cold rolled shafting, Buffalo	6.00c
Cold rolled shafting, New York	6.25c to 8.00c
Cold rolled shafting, Boston	8.00c
Cold rolled flats, squares and hexagons, New York	6.75c to 8.50c
Cold rolled rounds	6.25c to 8.00c

Mill Sheet Schedule

BLACK

Differentials for gage, per 100 pounds

No. 30	+20c
No. 29	+10c
No. 28 (carloads)	Base
No. 27	—05c
Nos. 25-26	—10c
Nos. 22-24	—15c
Nos. 17-21	—20c
Nos. 15-16	—25c
Nos. 13-14	—30c
Nos. 10-12	—35c

Standard Sizes

Gages Nos. 12 to 30 inclusive, 24, 26, 28 and 30 inches wide by 72, 84, 96 and 120 inches long. Gages Nos. 14 to 28 in addition to the foregoing, 36 wide by 96 inches and 120 inches long. Extras for width and length to be added.

Freight Rates

PIG IRON

Mahoning and Shenango valleys to:

Cleveland	$1.40
Newark, N. J.	4.80
Boston	5.20
Philadelphia	4.40
Pittsburgh	1.40
St. Louis	4.60
Minneapolis, St. Paul	5.70

Buffalo to:

Albany, N. Y.	$1.80
New England (rail)	3.90
New York and Brooklyn (rail)	3.90

Virginia furnaces to:

Philadelphia	4.10
New England	4.70
Brooklyn, Jersey City, Newark	4.40

Birmingham, Ala., to:

Boston	$3.00
Cincinnati	3.60
Chicago	5.00
Cleveland	5.00
Louisville, Ky.	3.30
Minneapolis, St. Paul	7.30
New York	7.70
Philadelphia	6.50
Pittsburgh	5.70
Savannah, Ga.	3.40
St. Louis	$4.30

Chicago to:

Des Moines	3.50
Minneapolis, St. Paul	2.50
Milwaukee	.60
Moline, Ill.	1.40
Omaha	4.50
St. Louis	1.90

Ironton and Jackson, O., to:

Chicago	$3.80
Cincinnati	1.30
Cleveland	2.40
Detroit	.60
Indianapolis	2.30
Minneapolis, St. Paul	5.70

FINISHED MATERIAL

Pittsburgh, carloads, per 100 lbs., to:

New York	27.0 cents
Philadelphia	25.0 cents
Boston	30.0 cents
Buffalo	21.0 cents
Baltimore	23.0 cents
Cleveland	17.0 cents
Cincinnati	23.0 cents
Chicago	27.0 cents
Detroit	23.0 cents
Minneapolis and St. Paul	49.5 cents
Denver	$1.09
St. Louis	33.5 cents
New Orleans	38.5 cents
Birmingham	57.5 cents
Pacific coast (all rail)	$1.25
Pacific coast (tin plate)	1.25

GALVANIZED AND LONG TERNE

No. 30	+50c
No. 29	+25c
No. 28 (carloads)	Base
No. 27	+15c
Nos. 25-26	—30c
Nos. 22-24	—45c
Nos. 17-21	—60c
Nos. 15-16	—75c
Nos. 12-14	—90c
Nos. 10-11	—1.00

Standard Sizes

Gages Nos. 12 to 30 inc., 24, 26, 28, 30 and 36 in. wide by 72, 84, 96 and 120 in. long. Extras for width and length to be added.

BLUE ANNEALED

Differential for gage per 100 pounds

Nos. 8 and heavier	— 5c
Nos. 9 and 10 (carloads)	Base
Nos. 11 and 12	+ 5c
Nos. 13 and 14	+10c
Nos. 15 and 16	+20c

Standard Sizes

Widths—24-26-28-30-36 and 48 inches.
Lengths—72-84-96-120 and 144 inches.
Extras for width and length to be added.

Tubular Goods

Pittsburgh basing discounts to jobbers in carloads

Steel Pipe

STANDARD WEIGHT

Butt Weld

	Black	Galvanized
⅛, ¼ and ⅜-inch	47 to 50½	20½ to 24
½-inch	51 to 54½	36½ to 40
¾ to 3-inch	54 to 57½	40½ to 44

Lap Weld

2-inch	47 to 50½	34½ to 38
2½ to 6-inch	50 to 53½	37½ to 41
7 to 12-inch	47 to 50½	33½ to 37
13 to 14-inch	37½ to 41	
15-inch	35 to 38½	

PLUGGED AND REAMED

Butt Weld

1 to 3-inch	52 to 55½	38½ to 42

Lap Weld

2-inch	45 to 48½	32½ to 36
2½ to 6-inch	48 to 51½	35½ to 39

EXTRA STRONG PLAIN ENDS

Butt Weld

⅛, ¼ and ⅜-inch	43 to 46½	25½ to 29
½-inch	48 to 51½	35½ to 39
¾ to 1½-inch	52 to 55½	39½ to 43
2 to 3-inch	53 to 56½	40½ to 44

Lap Weld

2-inch	45 to 48½	33½ to 37
2½ to 4-inch	48 to 51½	36½ to 40
4½ to 6-inch	47 to 50½	35½ to 39
7 to 8-inch	43 to 46½	29½ to 33
9 to 12-inch	38 to 41½	24½ to 28

DOUBLE EXTRA STRONG PLAIN

Butt Weld

½-inch	39 to 42½	28½ to 32
¾ to 1½-inch	42 to 45½	31½ to 35
2 to 2½-inch	44 to 47½	33½ to 37

Lap Weld

2-inch	37 to 40½	27½ to 31
2½ to 4-inch	39 to 42½	29½ to 33
4½ to 6-inch	38 to 41½	28½ to 32
7 to 8-inch	33 to 36½	19½ to 23

Wrought Iron Pipe

Pittsburgh basing discounts to jobbers in carloads

THREADS AND COUPLINGS

Butt Weld

	Black	Galv.
¼-inch	+ 9	+ 35
⅜-inch	15½ to 25½	+ 1½ to 11½
½-inch	19½ to 29½	1½ to 11½
¾ to 1½-inch	24½ to 34½	8 to 18½

Lap Weld

2-inch	20½ to 28½	6½ to 14½
2½ to 6-inch	22½ to 30½	9½ to 17½
7 to 12-inch	19½ to 27½	6½ to 14½

PLUGGED AND REAMED

Two points less than above

EXTRA STRONG PLAIN ENDS

Butt Weld

¼-inch	+ 17	+ 50
⅜-inch	13½ to 23½	6½ to +3½
½-inch	18½ to 28½	5½ to 15½
¾ to 1½-inch	24½ to 34½	9½ to 19½

Lap Weld

2-inch	21½ to 29½	8½ to 16½
2½ to 4-inch	23½ to 31½	11½ to 19½
4½ to 6-inch	22½ to 30½	10½ to 18½
7 and 8-inch	14½ to 22½	2½ to 10½
9 and 12-inch	9½ to 17½	5½ to +2½

DOUBLE EXTRA STRONG, PLAIN ENDS

Butt Weld

	Black	Galv.
½-inch	15½ to +39½	3½ to +51½
¾-inch	20½ to +22½	8½ to +34½
1-inch	+38½	+50½
1¼-inch	+22½	+34½
1½-inch	+21½	+33½

Lap Weld

2-inch	16½ to +7½	4½ to +10½
2½ to 4-inch	18½ to +2½	9½ to +11½